NASA

Management
A Continuing
Bibliography
with Indexes

NASA SP-7500 (13)
March 1979

National Aeronautics and
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MANAGEMENT

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- With Indexes -

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NASA Scientific and Technical Information Branch 1979
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INTRODUCTION

COVERAGE

Management is a compilation of references to selected reports, journal articles, and other documents on the subject of management. This publication lists 344 documents originally announced in the 1978 issues of *Scientific and Technical Aerospace Reports (STAR)* or *International Aerospace Abstracts (IAA)*.

SCOPE

This publication series includes references on the management of: research and development, contracts, production, logistics, personnel, safety, reliability and quality control. It also includes references on: program, project and systems management; management policy, philosophy, tools, and techniques; decisionmaking processes for managers; technology assessment; management of urban problems; and information for managers on Federal resources, expenditures, financing, and budgeting.

ORGANIZATION

Each entry in this bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two sections: *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* and *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Following the abstract sections, three indexes are included; subject, personal author, and corporate source.

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All publications abstracted in this bibliography are available to the public through the sources as indicated in the *STAR* Entries or *IAA* Entries. It is suggested that the bibliography user contact his own library or other local libraries prior to ordering any publications inasmuch as many of the documents have been widely distributed by the issuing agencies, especially NASA. A listing of public collections of NASA documents is included on the inside back cover.

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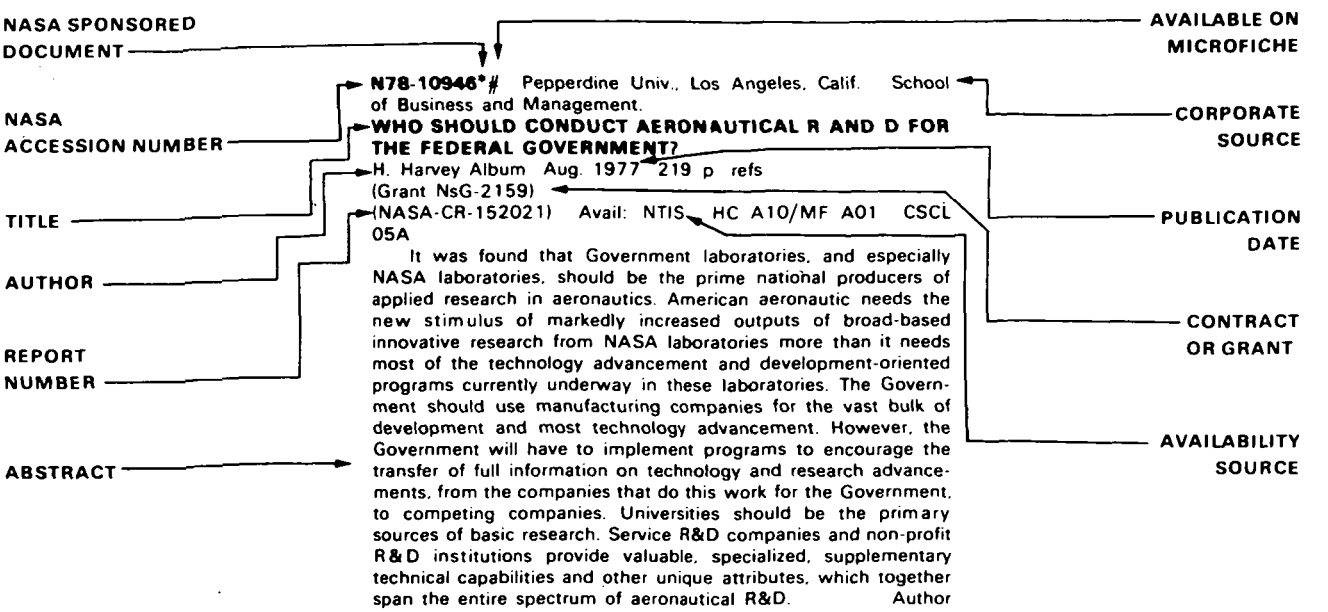

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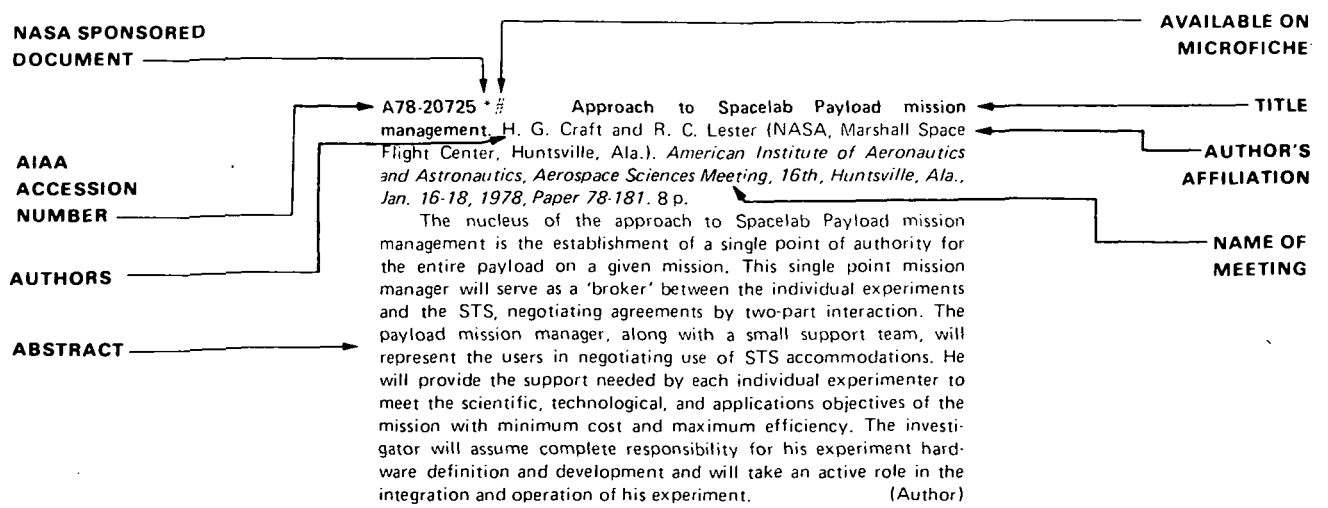

MANAGEMENT

A Continuing Bibliography

MARCH 1979

IAA ENTRIES

A78-10129 **Mathematics and decision in management sciences (*Mathématiques et décision en sciences du management*).** B. Roy (Paris IX, Université, Paris, France). *Sciences et Techniques,* Sept.-Oct. 1977, p. 34-43. 15 refs. In French.

The nature and role of models in management science is discussed. Three constraints - globality, stability, and transitive complete comparability - and the scope and limit of the optimization problem procedure are considered with reference to the mathematics of optimization and the constraints that all optimal decision models should satisfy. Several cases of preference modelization are analyzed with attention to criteria and to binary relationships. Alternatives to optimization procedures are presented in examples of problems involving choice, sorting, or ranking. M.L.

A78-12651 * **Computers in Aerospace Conference, Los Angeles, Calif., October 31-November 2, 1977, Collection of Technical Papers and Addendum.** Conference sponsored by AIAA, NASA, IEEE, and ACM. New York, American Institute of Aeronautics and Astronautics, Inc., 1977. Collection of Technical Papers, 477 p.; Addendum, 68 p. Members, $55.; nonmembers, $65.

Papers are presented on such topics as nuclear survivability concepts for airborne computers, military aerospace computer trends, a management approach to acquiring computer systems, software acquisition and verification, and future aerospace digital signal processing concepts. Also considered are CCD architecture for spacecraft SAR image processing, avionics software development for the B-1 aircraft, and software sneak analysis. B.J.

A78-12654 # **A management approach to the development of computer-based systems.** R. Turn, M. R. Davis, and R. N. Reinstedt (Rand Corp., Santa Monica, Calif.). In: Computers in Aerospace Conference, Los Angeles, Calif., October 31-November 2, 1977, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, Inc., 1977, p. 11-17. (AIAA 77-1380)

A management approach to acquiring computer systems is described which encompasses the whole system, with emphasis on the software, from the initial concept formulation to the support of the operational system. Expected improvements in the development processes and organizational implications of this management approach are discussed. B.J.

A78-12655 # **Elements of the Computer Program Development Plan.** R. J. Sylvester (USAF, Aeronautical Systems Div., Wright-Patterson AFB, Ohio). In: Computers in Aerospace Conference, Los Angeles, Calif., October 31-November 2, 1977, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, Inc., 1977, p. 18-22. (AIAA 77-1381)

Air Force Regulation 800-14 dictates that computer programs will be planned, analyzed, designed, coded, checked, integrated, tested, and delivered in accordance with a Computer Program Development Plan (CPDP). The CPDP is a management plan. This paper discusses the elements necessary to such a plan in terms of the classical management functions of definition of objectives, setting of goals, analysis and breakdown of work tasks, establishment of schedules, definition and establishment of organizational structures, allocation of resources, establishing standards, maintenance of motivation, accomplishing the work, and provision of management controls. The section of the paper relating to management controls specifically discusses status determination, management actions, documentation control, configuration control and quality assurance. (Author)

A78-12660 # **Considerations for a successful software test program.** F. J. Mullin (TRW Defense and Space Systems Group, Redondo Beach, Calif.). In: Computers in Aerospace Conference, Los Angeles, Calif., October 31-November 2, 1977, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, Inc., 1977, p. 68-74. 10 refs. (AIAA 77-1387)

This paper discusses software testing and software test activities as they should occur during the software development process. It notes that a well planned test program starts at the time software requirements are being produced and continues on through acceptance testing. It describes the activities and responsibilities of the group assigned to formally test the software and discusses their interactions with the people preparing the software requirements and the people developing the software. Three levels of testing are defined and suggested test support software is identified. (Author)

A78-12664 # **Software acquisition techniques.** E. B. Martin (McDonnell Douglas Astronautics Co., St. Louis, Mo.). In: Computers in Aerospace Conference, Los Angeles, Calif., October 31-November 2, 1977, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, Inc., 1977, p. 108-111. (AIAA 77-1396)

The paper presents a philosophy for use by program managers in evaluating software tasks and monitoring performance during development, using aerospace software for the Harpoon missile program as an example. It is shown that the software acquisition problem can be minimized by timely identification of software acquisition techniques, the key factors being technical expertise requirements, degree of task definition and software optimization importance. Evaluation of these factors provides the basis for the 'make or buy' decision as well as the formulation of a logical approach for in-house development or subcontract procurement. B.J.

A78-12671 * # ***Software engineering project management* - A state-of-the-art report.** R. H. Thayer (USAF, Sacramento Air Logistics Center, McClellan AFB, Calif.) and J. H. Lehman (California State University, Sacramento, Calif.). In: Computers in Aerospace Conference, Los Angeles, Calif., October 31-November 2,1977, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, Inc., 1977, p. 153-167. 11 refs. Research supported by the U.S. Air Force, NASA, et al. (AIAA 77-1408)

The management of software engineering projects in the aerospace industry was investigated. The survey assessed such features as contract type, specification preparation techniques,

software documentation required by customers, planning and cost-estimating, quality control, the use of advanced program practices, software tools and test procedures, the education levels of project managers, programmers and analysts, work assignment, automatic software monitoring capabilities, design and coding reviews, production times, success rates, and organizational structure of the projects. J.M.B.

A78-12672 # Experience in managing the development of large real-time BMD software systems. R. G. Schluter (McDonnell Douglas Astronautics Co., Huntington Beach, Calif.). In: Computers in Aerospace Conference, Los Angeles, Calif., October 31-November 2, 1977, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, Inc., 1977, p. 168-173. (AIAA 77-1409)

A research and development program charged with resolving key technical issues associated with designing, developing, and deploying a ballistic missile defense (BMD) system is discussed. The system includes a phased-array radar, a high-speed digital computer, and real-time software which controls the radar to track ballistic reentry vehicles. The complete tactical system includes high-performance interceptor missiles and control of the missiles in flight. Throughout the course of this program, approximately 1.6 million software instructions will have been developed (approximately 1.38 million have already been developed). Observations are made regarding management issues and decisions which strongly influence software costs and schedules. Two factors which, when combined, are shown to have influenced real-time software development costs by as much as a factor of seven are considered. These two factors are: percentage of Central Processing Unit and memory utilization required by the real-time application programs; and software breakage. (Author)

A78-12673 # Characteristics of managing real time software development for military systems. S. A. Steele (RCA, Missile and Surface Radar Div., Moorestown, N.J.). In: Computers in Aerospace Conference, Los Angeles, Calif., October 31-November 2, 1977, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, Inc., 1977, p. 174-181. 8 refs. (AIAA 77-1410)

A78-12674 # Software management lessons learned - The hard way. K. A. Hales (Boeing Aerospace Co., Seattle, Wash.). In: Computers in Aerospace Conference, Los Angeles, Calif., October 31-November 2, 1977, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, Inc., 1977, p. 182-188. (AIAA 77-1411)

The management of software development programs is discussed, with emphasis on problems that arise after requirement definition and preliminary design phases. Difficulties considered include the qualification of software developed by a subcontractor, the organizational structure of software engineering projects, scheduling of tasks, the specification of interfaces, the integration of software and hardware, and the identification of software problems. J.M.B.

A78-12685 # Overview of Air Force Logistics software management. C. H. Thompson (USAF, Logistics Command, Wright-Patterson AFB, Ohio). In: Computers in Aerospace Conference, Los Angeles, Calif., October 31-November 2, 1977, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, Inc., 1977, p. 257-259. (AIAA 77-1428)

A78-12686 # Logical planning for automatic test equipment software requirements. J. Ferrell (USAF, Automatic Test Equipment/Support Equipment Section, Kelly AFB, Tex.). In: Computers in Aerospace Conference, Los Angeles, Calif., October 31-November 2, 1977, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, Inc., 1977, p. 260-267. 5 refs. (AIAA 77-1429)

The discussions in this paper cover logical step by step planning to acquire automatic test equipment (ATE) software. The information can be used by Department of Defense agencies and industry. The principle of objective is cited and used as the focal point from which trade studies, life cycle costs are derived and planning decisions are made. Also, government resources are identified in the planning which are required for a full scale development task. The trade studies cover volume workload, testable complexity, commercial equipment versus military specification development, and operational needs. Life cycle costs cover acquisition, ten year maintenance factors, training and personnel skills. (Author)

A78-12699 # Test tool implementation. P. P. Howley and R. W. Scholten (Boeing Aerospace Co., Seattle, Wash.). In: Computers in Aerospace Conference, Los Angeles, Calif., October 31-November 2, 1977, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, Inc., 1977, p. 372-377. 16 refs. (AIAA 77-1447)

The results of the study described in the present paper indicate that, at least for decentralized aerospace companies with software projects organized as independent cost centers, automated test tools could be more effectively utilized if they were centrally managed. The purpose of the central management is to assure that the selection criterion for test tools satisfies predetermined project requirements, is based on a general methodology for software development, and is cost effective. Central management also provides direction for conducting trial studies to determine the full range of tool capabilities, their limits, and their proper applications. V.P.

A78-13500 # Problems concerning the determination of economic objectives for scientific-technical tasks (Probleme der Bestimmung ökonomischer Zielstellungen für wissenschaftlich-technische Aufgaben). G. Hebs (Gesellschaft für internationalen Flugverkehr mbH, Berlin, East Germany). *Technisch-ökonomische Information der zivilen Luftfahrt,* vol. 13, no. 4, 1977, p. 202-210. In German.

The utilization of the method of 'limit calculation' for the determination of the economic objectives of scientific-technical tasks is discussed. The considered method makes it possible to determine for the task the minimum requirements concerning the processing times, the costs, the utility, and the efficiency, in the form of limits. A description is given of the approaches which can be employed to determine the individual limit values required. G.R.

A78-14257 The management of technological risk. F. T. Ayers. *Research Management,* vol. 20, Nov. 1977, p. 24-28. 30 refs.

Risk is defined as the likely variability of future returns from a given asset/project. The sum of the risks associated with all of the company's assets/projects can be considered the total corporate risk. Different types of risks which can be considered in connection with the factors producing them include economic risk, ecological risk, social risk, political risk, and technological risk. It is pointed out that technological risk is generally ignored or understated in a corporation's planning process. Technological risk can be related to the emergence of a new technology which threatens the market of the corporation's product, an adverse reaction by society in connection with product-related environmental effects, and changes in societal values which alter the market for a product. The evaluation of technological risk is considered and attention is given to a ten-step process for a corporate planning system incorporating technological forecasting, technology assessment, and alternative future analyses. G.R.

A78-15121 # A multi-criteria approach to applied R and D planning - The case of qualitative criteria. S. V. Emel'ianov and O. I. Larichev (Institut Problem Upravleniia, Moscow, USSR). *Problems of Control and Information Theory,* vol. 5, no. 5-6, 1976, p. 385-399. 21 refs.

The paper considers development of a method for planning applied scientific research and development (R and D) allowing for both qualitative and quantitative estimates of R and D projects. Major stages of a heuristic algorithm are described that was developed for R and D plan generation. (Author)

A78-15551 NAECON '77; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 17-19, 1977. Conference sponsored by the Institute of Electrical and Electronics Engineers. New York, Institute of Electrical and Electronics Engineers, Inc., 1977. 1333 p. Members, $24.; nonmembers, $32.

Consideration is given to design to cost/life cycle costing, flight control, aerospace power system developments, software-compatible avionics processors, operational simulation in lab testing, pointing, tracking and stabilization, and design and integration of avionics digital systems. Attention is also given to tactical guided missiles, higher order languages, airborne communication systems, signal and sensor processing, high capacity memories, fire control technology, electrical insulation for high voltage aircraft systems, airborne radar, display devices, laser gyros, microprocessors, and navigation technology. B.J.

A78-15553 A contractor's perception of design to life cycle cost. R. E. Adel and F. X. Merlino (Northrop Corp., Electronics Div., Palos Verdes Peninsula, Calif.). In: NAECON '77; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 17-19, 1977. New York, Institute of Electrical and Electronics Engineers, Inc., 1977, p. 12-15.

A review is presented of the design to life cycle cost (DTLCC) technique, using a typical inertial navigation system as an example. The detailed cost elements (standard values, government furnished data and contractor furnished data) that are used in the many DTLCC algorithms are analyzed. The analysis is conducted on the basis of a typical report matrix for unit production cost, expanded to include MTBF and MTTR values. B.J.

A78-15560 Environmental tests and logistics support costs. P. H. Hermes (USAF, Aeronautical Systems Div., Wright-Patterson AFB, Ohio). In: NAECON '77; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 17-19, 1977. New York, Institute of Electrical and Electronics Engineers, Inc., 1977, p. 68-81. 14 refs.

The role of environmental tests in the acquisition process is reviewed. The purpose of, approaches to, and trends in environmental testing are given. The relationships between environmental and reliability tests are reviewed. The contributions to Logistics Support Costs (LSC) of avionic equipments are summarized which includes both the acquisition process, and the Operations and Support process. The impact of the various factorss contributing to avoidable LSC is reviewed with the conclusion that, because of the diversity of factors, significant LSC reductions can only be achieved by in-depth field investigations, using the combined resources of the acquisition, logistics, and operational organizations, to correct the LSC problem, and to feed back the lessons-learned to the appropriate organizations. (Author)

A78-15576 Standardization - Technology versus management. E. J. Radkowski and R. G. Blake (Itek Corp., Applied Technology Div., Sunnyvale, Calif.). In: NAECON '77; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 17-19, 1977. New York, Institute of Electrical and Electronics Engineers, Inc., 1977, p. 204-212. 8 refs.

The paper reviews the trend toward commonality and standardization current in military computer system development. Only minor differences appear to exist in the implementation of processors in use today, but these differences represent significant elements of the cost of acquisition and the use of the systems. It is found that the greatest hindrance to cost-effective standardization lies in DOD and industry management methods and motives. A philosophy from which initial standardization objectives can be attained is presented here along with recommendations for industry and DOD actions. B.J.

A78-15578 Planning a computer family. M. L. Kushner and J. P. Dorocak (IBM Corp., Systems Architecture Dept., Owego, N.Y.). In: NAECON '77; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 17-19, 1977. New York, Institute of Electrical and Electronics Engineers, Inc., 1977, p. 219-226.

This monograph presents the rationale for the development of a computer family. A systems implementation approach is presented which includes implementation related issues, such as architectural specification, maturity of the architecture, variability of members in the family, and compatibility limitations. Some homilies concerning computer family development are presented. (Author)

A78-15587 The primary specification. J. L. Weingarten (USAF, Aeronautical Systems Div., Wright-Patterson AFB, Ohio). In: NAECON '77; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 17-19, 1977. New York, Institute of Electrical and Electronics Engineers, Inc., 1977, p. 292-295.

The use of specifications and standards is vital to development and procurement of hardware for the Department of Defense. We in the Aeronautical Systems Division are actively pursuing an effort to improve our method of preparation and use of these documents. This paper describes a new approach to specifications, standards and handbooks that can be tailored to meet our fast changing technological and system program environment. To meet this objective, we have changed the basic thrust of these documents. Examples in the area of ilities are provided. (Author)

A78-15606 Operating dynamics of matrix management. W. R. Harden and W. R. Gretsch (Westinghouse Electric Corp., Baltimore, Md.). In: NAECON '77; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 17-19, 1977. New York, Institute of Electrical and Electronics Engineers, Inc., 1977, p. 452-457.

Major weapon systems contractors have required a unique and dynamic organization structure in order to cope with the myriad of problems that arise in the performance of the goals of the contract. The matrix or project form of organization structure has been utilized for many years. In theory, the project/functional management matrix interlaces the organization to bind it together and promote coordination. Desired goals of the project structure are to satisfy the customer in terms of a program that meets its cost objectives, schedule requirements, and performance needs. Functional management must assemble the necessary resources of talent and facilities to successfully perform the job and to achieve for the project structure its desired goals. The fact that DOD contractor has a variety of contracts in various phases of completion results in both benefits and pitfalls: Synergism and efficiency results in better achievement of goals, and internal competition for resources results in potential fragmentation and dissipation. The interactions between multiple programs and functional management can result in conflicts within the organization. (Author)

A78-15607 The dimensionality of influence sources in project management. M. J. Stahl and E. J. Dunne, Jr. (USAF, Institute of Technology, Wright-Patterson AFB, Ohio). In: NAECON '77; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 17-19, 1977. New York, Institute of Electrical and Electronics Engineers, Inc., 1977, p. 458-462. 9 refs.

This research addressed the questions of the dimensionality and the effectiveness of project and functional manager's influence in a matrix organization. Forty-nine project personnel were interviewed concerning nine influence sources of both managers, and their job satisfaction. Three independent influence dimensions were observed for each of the managers. The first two dimensions were common for both managers. The first dimension may be viewed as rewards/penalties and the second was labeled personal influence. The third dimension for the project manager was friendly informal influence, whereas the third for the functional manager was formal authority and position. For both managers, personal influence was shown to be effective since it was associated with supportiveness from the project personnel and the personnel's job satisfaction. The other influence dimensions were not related to either criteria. (Author)

A78-15608 **Management for engineering productivity.** J. A. Steger (Rensselaer Polytechnic Institute, Troy, N.Y.). In: NAECON '77; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 17-19, 1977. New York, Institute of Electrical and Electronics Engineers, Inc., 1977, p. 463-466.

Some new views of the management process are set forth in an effort to distinguish between high, medium and low performing managers. The evaluation of managers is performed on the basis of an analysis of six management functions: salesmanship, administration, technical professionalism, influence and control, training and development, and forecasting and planning. In conjunction with these functions are the three relational factors of motivator, director and evaluator. B.J.

A78-15676 **Acquisition guidelines for avionic systems.** L. D. Parriott, Jr. (TRW Defense and Space Systems Group, Redondo Beach, Calif.) and L. C. Taylor (USAF, Aeronautical Systems Div., Wright-Patterson AFB, Ohio). In: NAECON '77; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 17-19, 1977. New York, Institute of Electrical and Electronics Engineers, Inc., 1977, p. 1017-1021.

The Air Force Guidebook Program calls for the creation and use of guidelines, including checklists and examples, to apply technical and managerial discipline to the acquisition and support of weapon system computer sources. In the present paper, the status of software acquisition engineering guidebooks for airborne systems is reviewed, and a method for their implementation is proposed. Areas where extension of the Guidebook is needed are pointed out. V.P.

A78-15703 **An integrated approach to crew training simulator software acquisition.** K. B. Bausman (USAF, Aeronautical Systems Div., Wright-Patterson AFB, Ohio). In: NAECON '77; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 17-19, 1977. New York, Institute of Electrical and Electronics Engineers, Inc., 1977, p. 1201-1205.

Accomplishing effective management visibility and technical progress assessment of software design and development is critical to successfully acquiring complex crew training simulator systems. This paper discusses methodology which associates specifications, baselines, milestone reviews, audits, and design documentation to achieve required tracking, assessment, and control. The definition of methods and tools used in the integration of discipline activities in the simulator software acquisition cycle is an evolutionary process, of continually tailoring and refining procedures to meet training simulator needs. The methods discussed herein are being applied in the acquisition of current training simulator software and are consistent with the recent Air Force Regulation 800-14 directives. (Author)

A78-15881 **Managerial differences in assessing probabilities of technical success for R&D projects.** A. H. Rubenstein (Northwestern University, Evanston, Ill.) and H.-H. Schröder (Köln, Universität, Cologne, West Germany). *Management Science,* vol. 24, Oct. 1977, p. 137-148. 26 refs. Research supported by the Friedrich-Ebert-Stiftung and U.S. Army.

Based on the notion that the process of assessing probabilities of technical success for R&D projects is composed of four phases - the perception phase, the evaluation phase, the transformation phase, and the review phase - three types of variables are identified as accounting for individual differences in probability assessments: personal, organizational, and situational variables. The empirical findings about the impact of some selected variables on subjective probabilities are described and discussed for their relevance to the problem at hand. It is found that both an assessor's specific relations towards the project to be evaluated and his organizational rank may be of use in explaining individual differences in R&D probability assessments. (Author)

A78-15882 **Dynamic programming models of the nonserial critical path-cost problem.** A. O. Esogbue (Georgia Institute of Technology, Atlanta, Ga.) and B. R. Marks (Saint Mary's University, Halifax, Nova Scotia, Canada). *Management Science,* vol. 24, Oct. 1977, p. 200-209. 17 refs.

Efficient nonserial dynamic programming formulations involving pseudo-tasks and pseudo-stages are developed for a number of complex critical path-cost problems with nonserial precedence relationships, an important class of research and development scheduling problems. The dynamic programming techniques are insensitive to the nature of the time-cost function, provide a ready solution to the time-cost function for the entire project, and do not increase with complexity with an increasing number of tasks, but only with the degree by which the additional tasks complicate the precedence relationships. J.M.B.

A78-15899 **Reliability of several standby-priority-redundant systems.** J. R. Arora (Ministry of Defence R & D Organization, New Delhi, India). *IEEE Transactions on Reliability,* vol. R-26, Oct. 1977, p. 290-293. 8 refs.

Three models for standby redundant systems consisting of 2 or 3 dissimilar units with assigned operating and repair priorities are developed. The effect on system reliability of two repair disciplines is investigated, namely, head-of-line discipline and preemptive-resume discipline. Expressions are derived for the Laplace transforms of the various state probabilities, availability, and steady-state availability. P.T.H.

A78-16127 **Uncertainty and management's search for information.** J. S. Blandin (U.S. Naval Postgraduate School, Monterey, Calif.) and W. B. Brown (Oregon, University, Eugene, Ore.). *IEEE Transactions on Engineering Management,* vol. EM-24, Nov. 1977, p. 114-119. 14 refs.

This study empirically examines the relationship between perceived environmental uncertainty and the information search behavior of managers in organizational boundary-spanning positions. It tests hypotheses related to the perceived importance managers attach to external, internal, formal, and informal information sources, as environmental uncertainty increases. Managerial search behavior in electronics firms is contrasted with that in wood products firms. The findings suggest that certain information search behaviors appear to be associated with perceived uncertainty. Significant positive correlations were found to exist between the level of uncertainty perceived by managers and 1) their reliance on external sources of information, 2) their use of informal sources of information, 3) their frequency of use of all information sources, and 4) the amount of time they allocate to information gathering activities. (Author)

A78-16650 **A mathematical model for projecting the demand for scientists and technologists in national R & D institutes.** N. Joshi (Birla Institute of Scientific Research, New Delhi, India). *R & D Management,* vol. 8, Oct. 1977, p. 43-47.

A78-16715 **Planning and dynamic control of projects under uncertainty.** J. M. Burt (New Hampshire, University, Durham, N.H.). *Management Science,* vol. 24, Nov. 1977, p. 249-258. 5 refs.

This paper addresses the problem of planning and controlling (through resource allocation decisions) projects under conditions of uncertainty. Particular attention is given to the dynamic reallocation of resources over the duration of projects as information about actual activity times becomes known. The effect of resource allocations on an activity is represented by modifications in the probability function of the time to process that activity. Analytic procedures such as dynamic programming and distribution analysis, which might lead to optimal dynamic decision rules, are shown to be computationally intractable even for very small problems. For a set of project networks of relatively simple structure, the efficacy of several heuristic decision rules is tested via simulation. The results of these simulation studies indicate some general concepts that should be applicable to the management of larger, more realistic, projects. (Author)

A78-16716 ***Multi-attribute investment decisions* - A study of R & D project selection.** S. L. Schwartz (British Columbia, University, Vancouver, Canada) and I. Vertinsky (British Columbia, University, Vancouver, Canada; International Institute of Management, Berlin, West Germany). *Management Science,* vol. 24, Nov. 1977, p. 285-301. 39 refs. Research supported by the Department of Industry, Trade and Commerce of Canada and NATO.

In evaluating R & D opportunities executives make tradeoffs among three classes of attributes: commitment of resources, expected payoff, and risk. The focus of this study of Canadian top executives and R & D managers is the investigation of these tradeoffs and how they differ among executives and industries. On the basis of judgments of sixty hypothetical projects, alternative individual and group models were estimated using regression and discriminant analysis procedures. The results indicate that linear models provide good fit with observations of R & D investment judgments and that differences in tradeoffs between risk and rates of return can be related to the characteristics of the executives and their work environments. This information is useful for predicting R & D investment portfolios in an environment of changing opportunities. (Author)

A78-17800 **Planning horizons for a stochastic lead-time inventory model.** M. J. Liberatore (FMC Corp., Philadelphia, Pa.). *Operations Research,* vol. 25, Nov.-Dec. 1977, p. 977-988. 22 refs. Research supported by RCA.

The planning-horizon literature has thus far focused on the analysis of deterministic lead-time inventory systems. We show that under certain conditions several planning-horizon theorems hold in the stochastic lead-time case as well. Specifically, demands are assumed noninterchangeable and deterministic; thus production runs are assigned to sets of specific demands and can only be used in the satisfaction of those demands. When holding, backlogging, setup (ordering), and variable production costs are stationary over time, and when the lead-time distribution is invariant over time, it is always optimal to produce for sets of consecutive integral demands. Production dates for specific shipments follow from convexity properties. Building upon these results, we prove several planning-horizon theorems (of the Wagner-Whitin and Zabel varieties). A forward dynamic programming recursion is given. These results are shown to generalize those of the basic dynamic lot-size model. We present a numerical example that illustrates the sensitivity of the optimal policy to changes in lead-time variance. (Author)

A78-18797 **R&D tax policy.** R. N. Mattson (IBM Corp., Armonk, N.Y.). *Research Management,* vol. 21, Jan. 1978, p. 24-27. 15 refs.

Current U.S. tax law relevant to the promotion of science is compared with policies embodied in foreign tax law. Examples of deductible and nondeductible research expenses under U.S. tax law are discussed. It is suggested that a new responsibility of research management is to help industrial scientists understand how tax provisions promote or provide disincentives for research and development. The question of whether tax policy is enhancing or hindering technology advancement is considered with attention to restrictions on the tax deductibility of expenses incurred at foreign conventions. M.L.

A78-19548 # **Back to the drawing board.** H. W. Smith (Kansas, University, Lawrence, Kan.). *Astronautics and Aeronautics,* vol. 16, Jan. 1978, p. 65-68. 8 refs.

Scheduling of aerospace design programs is discussed. A sample analysis of the design process for the main gear and tires of a supersonic transport is presented. An important facet of the process is the requirement of providing newly generated data to other designers so that the program may proceed. In addition, the steps in developing a typical speed/altitude specification are described. J.M.B.

A78-20483 **Mergers - An alternative to nationalization of the U.S. air transport industry.** L. J. Haigley (National Airlines, Inc., Miami, Fla.). *Aviation Research Journal,* vol. 2, July 1977, p. 87-92.

The concept of mergers is proposed as an alternative to the drift toward governmental control (i.e., nationalization) of the air transport industry. It is suggested that by reducing the present eleven trunk carriers and one regional carrier to six, increased profits will result from the optimization of routes, improved aircraft utilization, and reduction in excess capacity. Various particular mergers are proposed. S.C.S.

A78-20725 * # **Approach to Spacelab Payload mission management.** H. G. Craft and R. C. Lester (NASA, Marshall Space Flight Center, Huntsville, Ala.). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 16th, Huntsville, Ala., Jan. 16-18, 1978, Paper 78-181.* 8 p.

The nucleus of the approach to Spacelab Payload mission management is the establishment of a single point of authority for the entire payload on a given mission. This single point mission manager will serve as a 'broker' between the individual experiments and the STS, negotiating agreements by two-part interaction. The payload mission manager, along with a small support team, will represent the users in negotiating use of STS accommodations. He will provide the support needed by each individual experimenter to meet the scientific, technological, and applications objectives of the mission with minimum cost and maximum efficiency. The investigator will assume complete responsibility for his experiment hardware definition and development and will take an active role in the integration and operation of his experiment. (Author)

A78-21198 **Solving the project time/cost tradeoff problem using the minimal cut concept.** S. Phillips, Jr. (South Florida, University, Tampa, Fla.) and M. I. Dessouky (Illinois, University, Urbana, Ill.). *Management Science,* vol. 24, Dec. 1977, p. 393-400. 8 refs.

This paper introduces a solution procedure for solving the project time/cost tradeoff problem of reducing a project duration at a minimum cost. The solution to the time/cost problem is achieved by locating a minimal cut in a flow network derived from the original project network. This minimal cut is then utilized to identify the project activities which should experience a duration modification in order to achieve the total project reduction. The paper will document this cut-based procedure and provide a practical application to a project situation. (Author)

A78-21199 **Multiteam, multiproject research and development planning with GERT.** L. J. Moore and B. W. Taylor, III (Virginia Polytechnic Institute and State University, Blacksburg, Va.). *Management Science,* vol. 24, Dec. 1977, p. 401-410. 14 refs.

This paper reports on a simulation study of multiple research and development projects that are worked on concurrently and sequentially by more than one research team. The technique employed in the modeling and simulation effort was Graphical Evaluation and Review Technique (GERT), which was used because of its capability to incorporate the probabilistic outcomes and feedback loops common to R&D projects. Some of the features included in GERT networking are probabilistic branching (stochastic models), network looping (feedback loops), multiple sink nodes (multiple outcomes), multiple node realizations (repeat events), and multiple probability distributions (assigned to activity times). Results of the simulation included statistical data on individual project duration and cost as well as overall network time and cost. These results were employed to provide management with an evaluation of different model configurations, prepare overall time and cost estimates as inputs to contract negotiations and to plan and schedule manpower, equipment and capital. Implementation experiences validated the model as satisfactory with the exception of several minor problems. (Author)

A78-21200 Joint economically optimal design of X and R control charts. E. M. Saniga (Delaware, University, Newark, Del.). *Management Science,* vol. 24, Dec. 1977, p. 420-431. 15 refs.

In this paper, we develop an expected cost model for a process whose mean is controlled by an X chart and whose variance is controlled by an R chart. The expected cost comprises the fixed and variable costs of sampling, the cost of investigating and correcting the process when at least one control chart indicates that the process parameters have shifted, and the cost of producing defective units. We use a search procedure to determine the sample size, interval between samples and control limits for both charts that minimize the expected cost. Optimal solutions to numerical examples are presented. A sensitivity analysis of the model is performed. In addition, we find the optimal interval between samples and the expected cost for several examples with large shifts in the mean and variance where Shewhart's heuristic design is used in place of the optimal design. Comparison of the expected cost of the optimal design to the expected cost of Shewhart's design shows an increase in expected cost of only 0.4 to 8.2 percent for the latter design. But other situations are discussed and examples presented which indicate that the optimal design is preferred. (Author)

A78-21838 Design to cost/life cycle costing; Proceedings of the Conference, Washington, D.C., November 16-18, 1977. Conference sponsored by the American Institute of Industrial Engineers. Edited by D. T. Newman (Management Education Corp., Santa Monica, Calif.). Santa Monica, Calif., Management Education Corp., 1977. 845 p. $50.

Government and industry experience in the management of acquisition programs is discussed, with particular attention given to the impact of life cycle costing on design to cost principles. The recent Office of Management and Budget directive on systems acquisition, design to cost guidelines of federal agencies, source selection directives and parametric cost modeling figure in the discussions. In addition, tracking of performance versus goals, the trade-off process and cost reduction procedures are considered. Case studies involve such problems as development of solar power systems for military bases, and avionics subsystem development. J.M.B.

A78-22348 Reliability growth models. H. S. Balaban (ARINC Research Corp., Annapolis, Md.). *Journal of Environmental Sciences,* vol. 21, Jan.-Feb. 1978, p. 11-18. 14 refs.

A reliability growth model is used to evaluate or predict the reliability potential of a device. The paper outlines some of the uses of the reliability growth concept, reports on some actual experiences of growth, and summarizes a number of approaches for modeling the growth process for both the discrete and continuous cases. Reasons for increased reliability of new equipment as development progresses to production and operation are considered. Mean time between failures (MTBF) growth models and success-probability models are discussed. It is suggested that the ability to quantify, measure, and predict stage-by-stage reliability achievement through growth models is an important element in meeting the life-cycle cost goals imposed by budgetary constraints. M.L.

A78-23455 Using efficiency incentives to allocate transit-operating deficits. H. A. Levine (R. L. Banks and Associates, Inc., Washington, D.C.). *Traffic Quarterly,* vol. 32, Jan. 1978, p. 87-104.

Itemization of transit revenues and expenditures for separate zones within a larger transportation system is suggested as a means to rationalize scheduling and fare structures; implementation of such a procedure in the Washington, D.C. metropolitan area is described. Several methods of financing transit deficits, including uniform-rate taxation, fares based on passenger-miles, contract agreements between contiguous areas, and defrayal from general government revenues, are also critiqued. J.M.B.

A78-24384 Eight imperatives for R & D. L. C. Thurow (MIT, Cambridge, Mass.). *Technology Review,* vol. 80, Jan. 1978, p. 64-71. 5 refs.

Several means by which the productivity of research and development programs might be increased are suggested. These include: (1) analyze R & D projects on the basis of basic-capability research, mission-oriented research, and massive-mobilization programs, (2) allocate funds for basic-capability R & D on the basis of various cross-disciplinary areas, (3) spend funds for mission-oriented research according to a cost-benefit analysis, (4) base massive mobilization research on the accumulation of basic knowledge, (5) disregard the probability of producing spinoffs and economic multipliers in allocating R & D expenditures, (6) overcome initial high unity costs and risks in civilian nonmedical production, (7) consider institutional constraints when allocating R & D expenditures, and (8) reduce or eliminate exclusive proprietary rights by widely disseminating progress reports. S.C.S.

A78-25129 The Navy's experimentation with zero-base budgeting. J. E. Smith (U.S. Navy, Office of the Assistant Secretary /Financial Management/, Washington, D.C.) and R. W. Downey (U.S. Navy, Office of the Navy Comptroller, Washington, D.C.). *Defense Management Journal,* vol. 14, Jan. 1978, p. 27-31.

The idea of zero base budgeting (ZBB) for government departments is considered to be an idea whose time has come. This report outlines the experience of the Department of the Navy with ZBB during Fiscal Year 1978. Various Navy programs having similar objectives were consolidated for budgetary purposes into one program. A budget justification format was then drawn up, including program description, a description of output (quantified when possible), and a detailed financial summary encompassing direct and indirect costs. The Navy's handling of ZBB was said to have produced positive results. D.M.W.

A78-25130 CLAMP on a tactical weapon system. G. Beck, Jr. (Westinghouse Defense and Electronic Systems Center, Baltimore, Md.). *Defense Management Journal,* vol. 14, Jan. 1978, p. 32-39.

The conventional system of resupply for naval aviation equipment is held to be unsatisfactory because it permits abuse of the one-to-one principle of part replacement, i.e., operators cannibalize working parts because of difficulties in obtaining the parts through authorized channels. A new system is proposed, CLAMP (Closed Loop Aeronautical Management System), in which authorization for part replacement will be much more clearly defined. The AWG-10 missile system for the F4J aircraft is used as an illustration of the functioning of CLAMP. D.M.W.

A78-25131 **Management by objectives in a Navy R&D laboratory.** P. L. Martin, L. W. Johnson, R. P. McNitt, and W. L. Stutzman (Virginia Polytechnic Institute and State University, Blacksburg, Va.). *Defense Management Journal,* vol. 14, Jan. 1978, p. 44-51. 8 refs. Contract No. N00014-75-C-0550.

The concept of structuring management techniques around a specific goal is discussed with reference to a Navy research and development lab. Attention is given to broad participation on the part of the professional and managerial staff in the formulation of project objectives. Completion of a project is planned within a certain time-frame, and adhered to, to ensure maximum efficiency. D.M.W.

A78-26400 **Managing the flow of technology: Technology transfer and the dissemination of technological information within the R & D organization.** T. J. Allen. Research supported by the National Science Foundation. Cambridge, Mass., MIT Press, 1977. 329 p. 85 refs. $20.

Office layout and the role of certain individuals in transmitting technical information gleaned from outside sources to colleagues within an organization provide important insights for understanding the flow of technological data within a research and development establishment. The contributions of conventions, journals, abstracts and informal discussions to solving research problems are also assessed. The possibility of developing a nonterritorial office layout to promote communication and increase problem-solving efficiency is mentioned. J.M.B.

A78-27822 **Principles of R & D management.** P. H. Francis (Southwest Research Institute, San Antonio, Tex.). New York, AMACOM, 1977. 228 p. 71 refs. $16.95.

The kinds of institutions engaged in modern R & D, the major sources and uses of R & D funding, and the broad responsibilities of R & D managers are discussed. Other topics include the elements of organization theory, management practice, elements of R & D technical marketing, and legal aspects of R & D management. The approach used is to integrate the fundamental principles of management theory with the practical focus utilized in the management process as applied to technology. M.L.

A78-27923 **Allocation planning for R & D with uncertainty and multiple objectives.** D. L. Keefer (Gulf Oil Corp., Pittsburgh, Pa.). *IEEE Transactions on Engineering Management,* vol. EM-25, Feb. 1978, p. 8-14. 28 refs. Research supported by the Whirpool Corp.

This analysis was conducted to aid management of a large corporation's Research and Engineering Division in planning the allocation of its budget among six areas of responsibility. The allocation problem is complicated by multiple competing objectives and uncertainty in the outcome corresponding to a given allocation policy. These characteristics were taken into account by eliciting a multiattribute utility function from two directors to quantify their preferences for multidimensional uncertain outcomes. Independence conditions verified with the two directors permitted decomposition of this function into appropriately scaled sums and products of one-dimensional utility functions, and this greatly simplified the assessment task. The expectation of the multiattribute utility function was used as the objective function to be maximized in the analytical model developed. The directors' judgments concerning the relationships between the allocation variables and the outcomes were quantified by assessing subjective probability distributions at fixed values of the allocation variables. Due to probabilistic independence (for a given allocation), the probability distribution of outcomes was the product of the marginal probability distributions; thus only one-dimensional probability distributions were required. (Author)

A78-27924 **Weighted productivity in R & D - Some associated individual and organizational variables.** M. J. Stahl (USAF, Institute of Technology, Wright-Patterson AFB, Ohio) and M. C. Koser (USAF, Space and Missile Systems Organization, Los Angeles, Calif.). *IEEE Transactions on Engineering Management,* vol. EM-25, Feb. 1978, p. 20-24. 21 refs.

Productivity in an Air Force Research and Development (R&D) Laboratory was measured with eight separate kinds of output, an unweighted total, and a weighted total measure of output for 135 scientists/engineers. The relationships among productivity and several individual and organizational variables were examined. (Author)

A78-28349 **How organizational factors affect R&D innovation.** J. G. Paolillo (Wichita State University, Wichita, Kan.) and W. B. Brown (Oregon, University, Eugene, Ore.). *Research Management,* vol. 21, Mar. 1978, p. 12-15. 11 refs.

Relationships between perceived innovativeness in R & D units and some structural and organizational characteristics of the R & D programs were investigated by means of a survey of employee and supervisor attitudes (N = 84). The data show that the characteristics of autonomy and creativity were indicated as important for innovativeness to the extent that the relationships were significant at the .001 level, while the responses concerning information flow, rewards, and average size of research project teams indicate significance at the .05 level. The presence of a large number of R & D employees was considered, significant at the .001 level, to be a hindrance to innovativeness. The size of the R & D budget and the number of technological forecasting techniques utilized were not viewed as significant. Managerial and research implications are discussed. M.L.

A78-28350 **Top-down and bottom-up approaches to project selection.** *Research Management,* vol. 21, Mar. 1978, p. 22-24.

The paper describes characteristics of the top-down and bottom-up approaches to R & D project selection and examines their relationship to some planning techniques. The bottom-up approach is considered an exploratory approach; characteristics of the exploratory approach are that it is short term and that the evaluation process starts with the means and seeks to optimize results. In contrast, the top-down approach is considered normative, a medium-term approach which takes the objectives as the starting point in the evaluation process and seeks to optimize the means. Disadvantages of the bottom-up approach include overemphasis of existing fields, failure to perceive shortcomings, and difficulty in organizing short, intermediate, and long range projects. The top-down approach might neglect important details while concentrating on overall planning and can hinder flexibility. The problems of harmonizing the advantages of the two approaches while recognizing their drawbacks are discussed. M.L.

A78-28806 * **Analysis of complex decisionmaking processes.** J. D. Hill and R. G. Ollila (Battelle Columbus Laboratories, Columbus, Ohio). *IEEE Transactions on Systems, Man, and Cybernetics,* vol. SMC-8, Mar. 1978, p. 193-204. 10 refs. Contract No. NASw-2970.

The analysis of corporate decisionmaking processes related to major system developments is unusually difficult because of the number of decisionmakers involved in the process and the long development cycle. A method for analyzing such decision processes is developed and illustrated through its application to the analysis of the commercial jet engine development process. The method uses interaction matrices as the key tool for structuring the problem, recording data, and analyzing the data to establish the rank order of the major factors affecting development decisions. In the example, the use of interaction matrices permitted analysts to collect and analyze approximately 50 factors that influenced decisions during the four phases of the development cycle, and to determine the key influencers of decisions at each development phase. The results of this study indicate that the cost of new technology installed on an aircraft is the prime concern of the engine manufacturer. (Author)

A78-29477 **A practical method of optimizing system life cycle costs vs availability.** R. B. Werden (ADGA Systems International, Ltd., Ottawa, Canada). *(Society of Reliability Engineers, Annual Canadian Symposium on Reliability Engineering, 4th, Ottawa, Canada, Oct. 13, 14, 1977.) Microelectronics and Reliability,* vol. 17, Jan. 1978, p. 1-7.

The effect will be shown, on availability and life cycle costs by equipment reliability, maintainability, system configuration and technician response time to equipment failures. Guidelines will be given to assist the project manager in determining best system parameters for minimizing life cycle costs for a particular application. (Author)

A78-30275 **A view of the government's role in energy research and development for the civilian sector.** F. A. L. Holloway (Exxon Co., New York, N.Y.). *Energy Systems and Policy,* vol. 2, no. 2, 1978, p. 145-157.

The serious nature of the U.S. energy problem and the need for a coherent national policy to guide energy R&D are described. The important role of the private sector in energy R&D is contrasted with the necessary role of government in defense and space R&D. There are inhibitions to private R&D imposed by current economic and regulatory policies and government-funded R&D competition. Studies show that government-funded R&D to satisfy civilian market needs is not as effective as private, competitive R&D. Concern is expressed that ERDA constitutes a high-risk and difficult mission in which a failure would have adverse consequences. Pending development of national policy and strategy, ERDA is encouraged to shift funds to universities, limit commercially oriented R&D in its laboratories, avoid duplication of privately funded efforts, and modify contracting and management procedures. (Author)

A78-30756 **Costs and escalation on U.K. aerospace projects.** K. Hartley (York, University, York, England) and J. Cubitt (HM Treasury, London, England). *R & D Management,* vol. 8, Feb. 1978, p. 83-89. 8 refs. Research supported by the Social Sciences Research Council.

Cost escalation is defined as the relationship between the original development cost estimate on a project and the actual outlays, expressed in constant prices. A framework for analyzing development cost escalation on aircraft projects is presented along with results on some limited tests of the model for British aerospace projects. Attention is focused on assessing the contribution to escalation of technical advance, duration, and pressure of demand. The approach differs from the conventional parametric one where it has been found that the 'best' explanations of aircraft development and production costs are weight, speed, and output. More specifically, the approach is based on an economical model of a development function which relates the quality of a project, its costs and the time scale. It is shown that duration and pressure of demand have some effect on cost escalation, that advanced technology projects appear to have no effect on escalation, and that medium-high technology grouping and pressure explain variations in the level of costs and development time scales, respectively. S.D.

A78-30774 # **Diagnostic charts for aerospace productivity improvement.** R. A. Harvey (British Aerospace, Weybridge, Surrey, England). *Aircraft Engineering,* vol. 50, Mar. 1978, p. 10-13.

It is noted that British aerospace productivity lags behind that of other industrial countries, especially the U.S. and France. Suggestions for improvement are dealt with in two broad categories: labor management, and capital investment. Attention is given to potentially conflicting proposals, i.e., more shift working (to cut costs) may adversely affect labor inputs; reduction of fuel and power inputs may result in decreased productivity per worker. D.M.W.

A78-32876 **Communications Satellite Systems Conference, 7th, San Diego, Calif., April 24-27, 1978, Technical Papers.** Conference sponsored by the American Institute of Aeronautics and Astronautics. New York, American Institute of Aeronautics and Astronautics, Inc., 1978. 773 p. Members, $65.; nonmembers, $75.

Papers are presented on Intelsat V design, the development of traffic scenarios for the future Intelsat system, operating experience in the Canadian domestic satellite systems, European capabilities in the field of microwave tubes for space use, the satellite transponder performance for the Experimental Communications Satellite, and ESA activities in millimeter-wave space communications. Consideration is also given to experiments with the Japanese Medium-Scale Broadcast Satellite, to space laser communications, to the Norwegian domestic communication satellite system, and to electric propulsion for communication satellites. B.J.

A78-32877 # **New management arrangements for Intelsat.** J. N. Pelton (International Telecommunications Satellite Organization, Washington, D.C.). In: Communications Satellite Systems Conference, 7th, San Diego, Calif., April 24-27, 1978, Technical Papers. New York, American Institute of Aeronautics and Astronautics, Inc., 1978, p. 1-7. (AIAA 78-527)

The paper reviews past and current developments and looks at potential future developments relating to the management of Intelsat. Emphasis is on how Intelsat plans to organize and manage itself in future years in order to ensure a continuing record of achievement while adjusting to a rapidly changing international telecommunications environment. Consideration is given to interim arrangements for the Intelsat Consortium (1965-1973) and Phase I (1973-1976), Phase II (1977-1978) and Phase III (starting in 1979) definitive arrangements. The detailed structure of the Intelsat executive organ under permanent management arrangements is described. B.J.

A78-34526 **A model for the selection of interdependent R&D projects.** D. A. Aaker (California, University, Berkeley, Calif.) and T. T. Tyebjee (Santa Clara, University, Santa Clara, Calif.). *IEEE Transactions on Engineering Management,* vol. EM-25, May 1978, p. 30-36. 12 refs.

This R&D project selection model provides for three types of project interrelationships: overlap in project resource utilization, technical project interdependence, and the project interaction with respect to value contribution. It also provides an input structure that should help diverse people in the organization communicate their knowledge and opinions to the R&D planning process. (Author)

A78-34527 **Probabilistic models of Project Management with design implications.** R. A. Brown (Alabama, University, Huntsville, Ala.). *IEEE Transactions on Engineering Management,* vol. EM-25, May 1978, p. 43-49. 25 refs.

The reported investigation has the objective to model the project management process. The model provides quantitative predictions of the minimum overruns to be anticipated as a function of the maximum risk and the distribution of risk associated with the project. The minimum overruns are compared with the experience of the Department of Defense (DOD) in weapon system procurement. Harman et al. (1971) have found that programs of low technical difficulty have a constant value of about 1.2 for cost growth versus the program duration. About 15% of the observed growth could be assessed against imprecise estimating. Taking into account various considered factors concerning the DOD cost overrun, there is still a residue of from 15 to 21% of observed cost overrun to be explained. This unexplained residue could be due to ineptitude in administration, inadequacies of the present model, overly conservative estimates of model parameters, or factors which have not yet been identified. G.R.

A78-35424 **How to construct an effective corporate R&D budget.** E. M. Kipp. *Research Management,* vol. 21, May 1978, p. 14-17.

It is pointed out that an effective corporate R&D budget depends to a large extent on an understanding on the part of scientists and engineers of the intricacies of the marketing and manufacturing problems with which corporations are faced. In other words, R&D personnel should endeavor not to isolate themselves in an 'ivory tower', but rather to involve themselves with the day-to-day practical activities of the company. It is suggested that R&D personnel assume that funding for their particular projects will continue at essentially the current level, and that requests for additional funding be communicated effectively in terms of overall corporate needs. D.M.W.

A78-35425 Federal policies and practices related to R&D/innovation. L. L. Lederman (NSF, Washington, D.C.). *(Engineering Foundation, Conference on Engineering and Science Research for Industrial Development, Easton, Md., Oct. 2-7, 1977.) Research Management,* vol. 21, May 1978, p. 18-20. 13 refs.

The roles of the public and private sectors in R&D are reviewed in terms of the circumstances where government intervention may be most effective. Three examples are presented: (1) support for institutional capability, primarily in the form of grants to universities and research centers, (2) contracts to private industry, especially in space and defense, and (3) support of private industry when the private sector is the main purchaser of the output, e.g., subsidies to civil aircraft manufacturers. Attention is given to the third instance, which is controversial. It is suggested that federal policy and practice should reinforce private market forces rather than substitute for them. D.M.W.

A78-35572 Trends in planning; A collection of essays from the Planning Department of the Swedish National Defense Research Institute /FOA/. Edited by C. G. Jennergren (Forsvarets Forskningsanstalt, Stockholm, Sweden), S. Schwarz (Kungl. Tekniska Hogskola, Stockholm, Sweden), and O. Alvfeldt. Stockholm, Forsvarets Forskningsanstalt, 1977. 325 p.

The development and the role of the planning division of the National Defense Research Institute in Sweden is considered, taking into account the role of science and technology in warfare, the rise of operations research in defense, the advisory role of the scientist, the role of an advisory organization, cooperation problems, research planning, and the importance of an active debate on defense problems. Attention is also given to program budgeting and/or long-range planning, international security studies for national defense planning, the use and usefulness of international-security studies, basic problems in planning, adaptive planning and the resolution of uncertainty, models in forecasting and analysis, and responsibility in decision-making. G.R.

A78-35853 Forgotten alternatives in skill and work-load. L. Bainbridge (Reading, University, Reading, Berks., England). *(International Congress of Psychology, 21st, Symposium on Mental Work Load, Paris, France, July 25, 1976.) Ergonomics,* vol. 21, Mar. 1978, p. 169-185. 28 refs.

It is pointed out that even in the most simple situation it is possible to do a task in different ways. Decisions between alternatives must involve some mental process, not necessarily conscious. To choose a strategy which matches not only the present external task requirements but also his own mental and physical state a person needs suitable knowledge concerning the external factors involved and his own capacities. An analysis is conducted regarding this knowledge and the decision-making process. It is suggested that with increased experience the number and complexity of task 'decisions' is reduced so that the amount of mental work needed to achieve a given task performance is reduced, and that the development of skill lies in this change in knowledge and decisions. It is also suggested that these decisions, which generate the sequence of behavior, are one locus of the breakdown of behavior under high task demands. Under normal circumstances a person tries to balance task demands and mental demands on his behavior. Increased task demands lead to changes in behavior priorities which the person is not necessarily experienced in reacting to. G.R.

A78-35885 Comparison of age, block, and failure replacement policies. M. Berg (Haifa University, Haifa, Israel) and B. Epstein (Technion - Israel Institute of Technology, Haifa, Israel). *IEEE Transactions on Reliability,* vol. R-27, Apr. 1978, p. 25-29.

Two widely used preventive replacement policies are the age replacement policy (ARP) and the block replacement policy (BRP). Another replacement policy is the failure replacement policy (FRP) in which no preventive replacements are made at all. In this paper we give a rule for choosing the least costly of the above three policies under conditions specified in the paper. The implementation of this rule is illustrated for two special cases, where the distribution of item life times is uniform, or 2-stage Erlang. (Author)

A78-36300 Management of information systems; Proceedings of the Seventh Mid-year Meeting, Rice University, Houston, Tex., May 21-24, 1978. Meeting sponsored by the American Society for Information Science. Dallas, Tex., Xerox Corp., 1978. 114 p.

Aspects of information resources management are considered along with research developments in the economics of information, planning models, the information manager, productivity assessments of information services, the management of technical information centers, the implementation of information systems, the organization of information resources, approaches for planning an information system, the evaluation of information systems, the dispersion of scientific literature, personal information management systems, user training for on-line systems, the management of information activities, numeric data bases, user on-line interaction, and recommended priorities for the future activities and structure of the American Society for Information Science. The management of specialized information systems is also discussed, taking into account information mangement in a cancer information analysis center, requirements for a health communication information management system, a health management information system, and a computer-assisted dynamic indexing system. G.R.

A78-37476 EASCON-77; Electronics and Aerospace Systems Convention, Arlington, Va., September 26-28, 1977, Record and Supplement. Convention sponsored by the Institute of Electrical and Electronics Engineers et al. New York, Institute of Electrical and Electronics Engineers, Inc., 1977. Record, 781 p.; Supplement, 41 p. Members, $21.; nonmembers, $28.

Radar tracking, radar data processing, projected extensions of the Intelsat system, domestic satellite communication systems, broadcast satellites, millimeter radar, digital device technology, and voice processing and error control techniques for communications systems are discussed. Topics of the papers include recent developments in TDMA, modulation techniques, digital charge coupled devices, millimeter-wave antenna design, an optimized spin-stabilized satellite concept, a 12-GHz FM receiver for broadcast satellites, recent advances in CRT technology, a demand assignment protocol for distributively controlled packet satellite communication networks, and a multiple-target radar tracking logic. J.M.B.

A78-37508 Architecture and management of DoD satellite communications programs. J. H. Babcock (U.S. Department of Defense, Washington, D.C.). In: EASCON-77; Electronics and Aerospace Systems Convention, Arlington, Va., September 26-28, 1977, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1977, p. 21-3A to 21-3F. 12 refs.

DoD has used satellites since the early 1960s. Early R&D programs have transitioned in the current generation of systems to investment programs. The next generation architecture is largely defined, uses both UHF and SHF, and will be implemented in the next few years. The Military Satellite Office at the Defense Communications Agency has played a key role in the definition of future program plans and architectural studies. A review of the management and DoD organization for MILSATCOM has been undertaken. The Air Force now has responsibility for all

MILSATCOM space segment funding, development, and acquisition for the next generation systems, and there is a considerable strengthening and focusing of the role of the MSO in system engineering, program management, and architecture development. Management analyses continue on funding strategies, and the mix of leased and purchased satellite services and systems. (Author)

A78-37972 The evaluation of large projects in accordance with the technical and the economic risk (Die Bewertung von Grossprojekten nach ihrem technischen und wirtschaftlichen Risiko). D. Oesterer. *Wissenschaftliche Berichte AEG-Telefunken,* vol. 50, no. 4-5, 1977, p. 146-151. 7 refs. In German.

The reported investigation considers in addition to purely economic aspects also technological factors as input parameters for the study of the risk. A quantification of the technology-related risk is attempted. This technical risk occurs mainly in the development phase of a project and is, therefore, termed 'development risk'. The determination of the development and the economic risk provides a basis for a decision regarding the start, the continuation, or, possibly, the termination of the project. Attention is given to the time and the accuracy of risk determination, the approaches used for determining the development risk, the rules for making a decision regarding development projects, and the economic risk of a project. G.R.

A78-38802 Problems of the theory of strength related to aircraft construction and civil engineering; Structural Mechanics Meeting, Ottobrunn, West Germany, June 1, 2, 1977, Lectures and Discussion Contributions (Probleme der Festigkeitsforschung im Flugzeugbau und Bauingenieurwesen; Strukturmechaniktagung, Ottobrunn, West Germany, June 1, 2, 1977, Vorträge und Diskussionsbeiträge). Edited by M. Esslinger and B. Geier (Deutsche Forschungs- und Versuchsanstal für Luft- und Raumfahrt, Institut für Strukturmechanik, Braunschweig, West Germany). Braunschweig, Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, 1977. 333 p. In German. $18.50.

The papers in this collection examine the use of new materials in aircraft construction, in particular, fiber-reinforced plastics and composites, and present analyses of strength problems for aircraft and civil engineering structures. Topics covered include sailplanes of carbon-fiber construction, theoretical studies of crash behavior of cell structures, Wöhler curves obtained by nonlinear regression analysis, finite element analysis of linear-eleastic wing behavior, CFRP primary structure for aircraft fighter taileron, buckling analysis of fiber wound cylinders, and research philosophy. P.T.H.

A78-38817 # Criteria for determining whether a research proposal is worthy of being pursued (Auswahlkriterien für die Förderungswürdigkeit von Forschungsvorhaben). W. Finke (Bundesministerium für Forschung und Technologie, Bonn, West Germany). In: Problems of the theory of strength related to aircraft construction and civil engineering; Structural Mechanics Meeting, Ottobrunn, West Germany, June 1, 2, 1977, Lectures and Discussion Contributions. Braunschweig, Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, 1977, p. 302-306. In German.

Three viewpoints are elucidated under which it is claimed that all proposals for research should be examined in order to determine whether they should be adopted and pursued: continuity, vitality, quality. Continuity is related to the personal trait of perseverance, vitality is related relevance and maintenance of interest, and quality means that only careful work based on excellent ideas can insure success. It should be borne in mind that the purpose of research is to further the progress of research, and continuity, vitality, and quality are the primary means of achieving this, all else being of secondary importance. P.T.H.

A78-39544 Toward criteria in the development of urban transportation systems. J. S. Sagner and R. L. Barringer (Southern Illinois University, Edwardsville, Ill.). *Transportation,* vol. 7, Mar. 1978, p. 87-96. 23 refs.

Improved criteria are necessary to determine awards of federal funds for metropolitan transit projects. Commuting is the main use for public transit. Thus, a primary objective of an urban transit system should be to provide a flexible and balanced set of options to the workers in the metropolitan area for their journey to work. This paper discusses various facets of an appropriate balance among the three modes: rapid rail, bus, and automobile. Three cities are selected for further analysis: Baltimore, Kansas City, and Phoenix. These cities represent different stages in economic-transportation development, and also present different spatial patterns of residence and employment. The applicability of rapid rail transit to each city is examined in view of central city worker concentration and recent trends. (Author)

A78-40391 # Optimal group scheduling on multiple production stages - Theoretical analysis. T. Yoshida and K. Hitomi (Osaka University, Osaka, Japan). *Osaka University, Technology Reports,* vol. 28, Mar. 1978, p. 261-270. 7 refs.

A theoretical study is made of optimal group scheduling on multiple production stages. The job processing times are not random, but assumed to be interrelated. A theorem and two algorithms are derived in order to determine optimal group sequence and job order under the criterion of minimum total elapsed time. Numerical examples are presented to demonstrate the theorem's effectiveness. S.C.S.

A78-43003 # Compromise schemes in problems of multiple-criterion optimization (O skhemakh kompromissov v zadachakh mnogokriterial'noi optimizatsii). A. N. Voronin (Akademiia Nauk Ukrainskoi SSR, Institut Kibernetiki, Kiev, Ukrainian SSR). *Elektromekhanika,* Apr. 1978, p. 405-410. 7 refs. In Russian.

Selection of compromise schemes in solving problems of multiple-criterion optimization is related to a specific situation for decision making. The investigation is carried out in terms of dynamic control systems for which the concept of situation is identified with the vector of external conditions. A nonlinear model of optimization is proposed for the case where a significant variation of external conditions is possible. An illustrative example for a control process with two particular quality criteria is treated. S.D.

A78-43026 Modeling and simulation. Volume 8 - Proceedings of the Eighth Annual Pittsburgh Conference, University of Pittsburgh, Pittsburgh, Pa., April 21, 22, 1977. Parts 1 & 2. Conference sponsored by the University of Pittsburgh. Edited by W. G. Vogt and M. H. Mickle. Pittsburgh, Pa., Instrument Society of America, 1977. Pt. 1, 648 p.; pt. 2, 544 p. Price of each part, $37.50.

The papers in this volume present and discuss new models for analysis in the fields of energy systems, transportation systems, vehicle dynamics, estimation and control theory, reliability, network analysis, signal processing, computer systems, biomedical systems, ecosystems, societal decision making, urban and regional planning, and economics. Individual studies include turbulence and stability estimates in atmospheric dispersion modeling, station analysis of a personal rapid transit system, hybrid technique for spacecraft attitude interpolation with arbitrary attitude data gaps, Routh approximations in state space, optimal preventive maintenance and replacement strategies under Markovian deterioration, vector processing in simulation, hierarchy of simulation models for a turbofan gas engine, and a high-speed programmable computer monitoring, simulation, and analysis system using distributed microprocessor techniques. P.T.H.

A78-43028 A methodology for transportation policy formation and evaluation. D. R. Drew (Virginia Polytechnic Institute and State University, Blacksburg, Va.). In: Modeling and simulation. Volume 8 - Proceedings of the Eighth Annual Pittsburgh Conference, Pittsburgh, Pa., April 21, 22, 1977. Part 1.

Pittsburgh, Pa., Instrument Society of America, 1977, p. 135-141.

A new approach to statewide transportation planning is proposed that makes use of cross impact matrices of transportation goals and policies. These matrices provide a convenient framework for classifying problem areas and searching for solutions. Causal diagrams used in conjunction with the cross impact analysis permit qualitative evaluation. Quantitative evaluation of policy options is accomplished using simulation. Transportation issues in Virginia are used to illustrate the methodology. (Author)

A78-43074 **Managing for responsive research and development.** S. P. Blake. San Francisco, W. H. Freeman and Co., 1978. 290 p. 164 refs. $17.50.

Aspects of research and development strategy are examined, taking into account project selection and evaluation, questions of technological forecasting, the procedures to be used in approaching a research and development problem, and the role, size, and composition of research and development. Suitable approaches for managing the research and development organization are considered. It is pointed out that the success and growth of organizations, and research and development organizations in particular, depend to a considerable degree on the extent to which creative ideas are allowed to be introduced and implemented. Attention is given to the creative environment, the stimuli for creativity in research and development, deterrents to creativity, the process of creativity, and the physical facilities. The organization of research and development activities is considered along with the matrix organization for project management, financial controls for research and development, technical services support considerations, and conclusions and implications for management. G.R.

A78-43277 **An evaluation system for project selection.** M. J. Cooper (NSF, Office of Planning and Policy Analysis, Washington, D.C.). *Research Management*, vol. 21, July 1978, p. 29-33.

A simple methodology is presented for selection of research projects. The primary criteria for judging a research program are impact, feasibility, and research merit. Impact is defined in terms of programmatic relevance and organizational authority but is discounted for the effectiveness of its coupling to the user. Feasibility is defined with respect to technological risk, technical competence, and management effectiveness. Research merit involves attractiveness as to research opportunity, the likelihood that more research will be fostered, and technical strengths. Cost-benefit calculations are not included. The methodology is intended to provide the elements of a well-defined common language for use by bench scientists and senior management. A hypothetical example of the application of the methodology is presented. M.L.

A78-44123 **Energy analysis and energy RD&D - Planning and decisionmaking.** R. H. Williamson (U.S. Department of Energy, Office of the Assistant Administrator for Planning, Analysis and Evaluation, Washington, D.C.). In: Energy analysis: A new public policy tool. Boulder, Colo., Westview Press, Inc. (AAAS Selected Symposia Series, No. 9), 1978, p. 88-96.

The paper presents a status report on what ERDA has done in the way of net energy analyses, summarizes the energy analysis procedures and guidelines used within ERDA, reports a few insights and findings from ERDA's current work, and discusses how ERDA is currently progressing towards the use of net energy analysis in decision-making. The goals of the ERDA net energy analysis are to obtain an initial energy analysis for each of the generic technologies under consideration, to improve the definitional and computational aspects of net energy analysis, and to establish some uniform guidelines for the sake of compatibility. M.L.

A78-44814 **Weapon systems planning: Systems engineering formulations and contributions (Waffensystemplanung: Systemtechnische Ansätze und Beiträge).** Edited by R. K. Huber, H. Schelle, and H. W. Hofmann (München, Hochschule der Bundeswehr, Munich, West Germany). Munich, R. Oldenbourg Verlag GmbH, 1977. 422 p. In German. $30.05.

Aspects of systems analysis and weapons system planning are considered along with the procedures and the management of armament planning. The future-technology program of the German Federal Ministry of Defense within the framework of long-term defense-technology research and development planning is discussed, along with defense-technology systems analyses involving the application of parametric design methods, the evaluation of ideas concerning technical solutions related to air defense weapons, and cost predictions in the case of research and development projects with the aid of estimation equations. Attention is also given to the reliability of weapons systems, problems of integrated time, cost, and performance planning in the case of research and development projects, computer-aided project management in the development and construction of a modern aircraft, and planning weapon system acquisition in the U.S. Air Force. G.R.

A78-44815 **Systems analysis and weapons system planning - Foundations, assessment, problems (Systemtechnik und Waffensystemplanung - Grundlagen, Ansatz, Probleme).** R. K. Huber (München, Hochschule der Bundeswehr, Munich, West Germany). In: Weapon systems planning: Systems engineering formulations and contributions. Munich, R. Oldenbourg Verlag GmbH, 1977, p. 17-71. 54 refs. In German.

The origin of systems engineering is related to certain development trends in technology. These trends are characterized by a steadily growing rate of technical innovations, the heterogeneity of the components of technical systems, and the interaction between technology and the natural and social environment. The essential concepts of system analysis are examined, taking into account the definition of a system as a mathematical set, the system concept in the case of a consideration of fighter aircraft, the system hierarchy of a military defense system, the simplified structure of an air and land warfare system, questions of system behavior, forms of system stabilization, and model concepts. Attention is also given to problems of system planning, material systems of systems engineering, institutional and procedural systems, and problems of a weapons system analysis. G.R.

A78-44816 **Armament planning - Tasks, organization, procedures, management (Rüstungsplanung - Aufgaben, Organisation, Verfahren, Management).** H. Mertens (Bundesministerium der Verteidigung, Bonn, West Germany). In: Weapon systems planning: Systems engineering formulations and contributions. Munich, R. Oldenbourg Verlag GmbH, 1977, p. 73-103. 5 refs. In German.

Armament planning has the objective to assure that the equipment of the armed forces with weapons and supporting material corresponds to the status which must be maintained for the efficient fulfillment of the mission assigned to the military forces of West Germany. The armament sector concerned with providing the required equipment has to work in close cooperation with the military and the corresponding agencies in research and industry. Organizational questions regarding the planning system of the armed forces of West Germany are considered. One central agency was established for the development and the provision of the material needed by the armed forces. The organization of the West German Federal Ministry of Defense is shown in a graph. Project armament sections exist for land, air, and sea defense. Attention is given to the procedures of armament planning, the management of the armament sector, specific market conditions for the armament industry, and the necessity for international cooperation. G.R.

A78-44817 **The future-technology program of the Federal Ministry of Defense within the framework of long-term defense-technology research and development planning (Das Zukunftstechnik-Programm des BMVg im Rahmen der langfristigen wehrtech-**

nischen Forschungs- und Entwicklungsplanung). H. Ambos (Bundesministerium der Verteidigung, Bonn, West Germany). In: Weapon systems planning: Systems engineering formulations and contributions. Munich, R. Oldenbourg Verlag GmbH, 1977, p. 105-126. 6 refs. In German.

Defense-technology research and development planning can be represented as an optimization problem, related to the appropriate distribution of the material and personnel resources which are available for research and development objectives. The distribution has to provide an optimum degree of fulfillment of the tasks assigned to the armed forces. These tasks are related to deterrence in time of peace and, in the case of an assault, the repulse of the attacker in the vicinity of the border. The resulting resource allocation problem is very complex. The procedure used for solving it involves the stepwise implementation of a heuristic planning process. The activities of defense-technology research and development planning are discussed. The most important task is related to an analysis of the technical problems and possibilities. This analysis is to provide the basis for a trend prognosis regarding future weapons systems, taking into account in particular also developments concerning the potential adversary. Attention is given to the financial framework of armament planning, planning methodology regarding the preparatory phases of projects, and the procedural steps involved in the implementation of a program concerned with future technology in the area of air defense. G.R.

A78-44820 Cost prognoses in the case of research and development projects with the aid of estimation equations (Kostenprognosen bei F + E-Projekten mit Hilfe von Schätzgleichungen). H. Schelle (München, Hochschule der Bundeswehr, Munich, West Germany). In: Weapon systems planning: Systems engineering formulations and contributions. Munich, R. Oldenbourg Verlag GmbH, 1977, p. 239-277. 81 refs. In German.

The approaches for cost estimation on the basis of equations obtained with the aid of regression analysis were mainly developed in the U.S. in connection with military projects. It was found that in the case of a development of hardware the parametric cost estimating models are reasonably accurate. In the reported investigation the attempt is made to classify the great variety of models and to compare the individual model categories with each other. The factors which have an effect on costs are systematically investigated. Attention is given to technical characteristics, temporal quantities, measures regarding technical advances, management factors, variables related to a consideration of learning effects, problems of data acquisition and processing, statistical problems, proposals for model extensions, and the limits regarding an application of equations for estimating costs. G.R.

A78-44821 Reliability of weapons systems (Zuverlässigkeit von Waffensystemen). H. W. Hofmann (München, Hochschule der Bundeswehr, Munich, West Germany). In: Weapon systems planning: Systems engineering formulations and contributions. Munich, R. Oldenbourg Verlag GmbH, 1977, p. 279-313. 26 refs. In German.

The significance of reliability questions has greatly increased in connection with the planning of complex weapons systems which in general are also more easily affected in their operation by disturbing effects. Reliability aspects in conjunction with ease of maintenance have now become decisive system parameters. The basic concepts of reliability theory are illustrated with the aid of examples, and the possibilities of an employment of operations-research methods in the case of optimization computations on the basis of reliability data are discussed. Questions of reliability management in the case of weapons system planning are also investigated. Attention is given to the characteristic parameters of reliability, the reliability of systems with several components which are independent of each other, the reliability of weapons systems and the effectiveness of their employment, aspects of reliability optimization, considerations related to spare parts in the case of an introduction of new weapons system, reliability program classes, and reliability models. G.R.

A78-48422 # Solvability of boundary value problem for higher-order differential operator equations (Razreshimost' granichnykh zadach dlia differentsial'no-operatornykh uravnenii vysokogo poriadka). V. K. Romanko (Moskovskii Fiziko-Tekhnicheskii Institut, Moscow, USSR). *Differentsial'nye Uravneniia,* vol. 14, June 1978, p. 1081-1092. 15 refs. In Russian.

Equations whose coefficients are linear operators in a Hilbert space with specified spectral properties are analyzed, and a method of determining the simplest boundary conditions which ensure unique solvability (or Fredholm properties) of the boundary value problems is proposed. The determination of the simplest boundary conditions depends essentially on the arrangement of the spectrum of the characteristic operator bunch. Cases involving the presence of an operator-coefficient at the higher derivative are examined. V.P.

A78-44824 Integrated time and cost planning in development projects, illustrated with the aid of a practical example (Integrierte Zeit- und Kostenplanung bei Entwicklungsprojekten - dargestellt an einem praktischen Beispiel). M. Saynisch (Maschinenfabrik Augsburg-Nürnberg AG, Augsburg, West Germany). In: Weapon systems planning: Systems engineering formulations and contributions. Munich, R. Oldenbourg Verlag GmbH, 1977, p. 377-395. In German.

A description is presented of the integrated time and cost planning activities in the research and development area of an enterprise which conducts projects, involving a high level of innovation, in the areas of nuclear technology, energy technology, traffic technology, materials technology, astronautics, and defense technology. The organizational system for the conduction of a project is considered along with the project structure plan and the conduction of the progress and time analysis. Attention is also given to the project cost analysis, the employed electronic data processing programs, and questions of integration in connection with operation planning objectives. G.R.

A78-44825 Planning weapon system acquisition in the United States Air Force. E. J. Dunne (USAF, Institute of Technology, Wright-Patterson AFB, Ohio). In: Weapon systems planning: Systems engineering formulations and contributions. Munich, R. Oldenbourg Verlag GmbH, 1977, p. 396-415.

The U.S. Air Force organizational approach to weapon system acquisition is examined and a brief history of the weapon system acquisition process is presented, taking into account the control of program costs, the maintenance of competition in industry for weapon system acquisition programs, and improved test and evaluation procedures. The role of analysis in weapon system acquisition is investigated, giving attention to design analysis, cost analysis, cost effectiveness analysis, program management analyses, the use of models, and the employment of cost-benefit analysis. A description is presented of the history of PERT (program evaluation and review technique), giving attention to the rapid acceptance of PERT, the brief period of extensive use, and the swift decline of this major management technique. G.R.

A78-46247 Satisfaction and performance in research and development tasks as related to information accessibility. H. D. Dewhirst, E. M. Brown (Tennessee, University, Knoxville, Tenn.), and R. D. Arvey (Houston, University, Houston, Tex.). *IEEE Transactions on Engineering Management,* vol. EM-25, Aug. 1978, p. 58-63. 21 refs. NSF-supported research.

The present study examined relationships between intrinsic job satisfaction and group performance in both the research and development sections of a large R&D organization and the accessibility to the following three types of information: (1) externally generated technical information, (2) internally generated technical information, and (3) goal-related information. For research sections, relationships between external information accessibility and both satisfaction and performance were positive. Unexpectedly, there was no similar finding for development tasks. Accessibility of internal technical information was strongly correlated with both satisfaction and performance in development sections, but not strongly related to either intrinsic satisfaction or performance in research sections. For

development groups, goal-related information accessibility was strongly related to both performance and satisfaction, while with research groups there was near-zero correlation with satisfaction and negative correlation with performance. The results suggest that external information is more important to research than to development. Both internal technical and goal-related information are dramatically more important for development tasks. P.T.H.

A78-46248 An analysis to implement a staggered four-day forty-hour workweek at a general jet aircraft manufacturing company. R. H. Milligan (Gates Learjet Corp., Tucson, Ariz.). *IEEE Transactions on Engineering Management*, vol. EM-25, Aug. 1978, p. 64-68. 7 refs.

In a study to determine if a staggered four-day forty-hour workweek could be used to keep departments functioning seven days per week, ten hours per day, it was found that, in large work crews, this would be economically beneficial to the company. Management was attempting to eliminate the additional weekend overtime by going to this method, except that in small work crews this was found to be very costly. It was concluded that each department should have its mode of operation and workweek tailored individually according to its size and type of function. This meant that a staggered four-day forty-hour workweek would be used in some departments while flexi-time and an optimum work-force mix would be used in other departments in order to make the best use of all departments under consideration. (Author)

A78-49851 NAECON '78; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 16-18, 1978. Volumes 1, 2 & 3. Conference sponsored by the Institute of Electrical and Electronics Engineers. New York, Institute of Electrical and Electronics Engineers, Inc., 1978. Vol. 1, 492 p.; vol. 2, 501 p.; vol. 3, 419 p. Price of three volumes, members, $22.50; nonmembers, $30.

The topics considered are related to navigation systems design, Navstar GPS-1, flight control, advanced digital system architectures, improved electronic reliability through packaging and interconnections, fire control technology, software engineering technology, software support and performance monitoring tools, the management of engineering, Navstar GPS-II, sensor and signal processing, communication techniques for jamming resistance, technology in medicine, tactical guided weapon systems, avionics software support systems, system design and integration, laser gyro technology, microcomputer technology, electrical insulation in airborne equipment, lightning and EMP considerations in airborne equipment, airborne laser systems, and tactical guided weapon technology. Attention is also given to the software executive, aerospace power system developments, inertial technology, aerospace computer families, data communication systems, energy conservation technology, pointing and tracking, higher order language status, power conditioning electronics, navigation, cost estimating methodology, communication system components, airborne radar, software standardization, automatic test equipment software, airborne infrared receiver systems, Kalman filtering applications, avionics design for testability, strategic guided weapons, topics in software acquisition management, and environmental factors on airborne electronic design. G.R.

A78-49885 Managing research and innovation. F. J. Russ and S. A. Barre (Systems Research Laboratories, Inc., Dayton, Ohio). In: NAECON '78; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 16-18, 1978. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1978, p. 268-274. 10 refs.

This paper discusses some of the challenges of managing an organization that is engaged in research for generating new knowledge and is innovative in applying this knowledge in creating a new product, business or market. This knowledge will serve in the place of other resources in the next generation to continue our improved living standards. The role of top management in this type organization differs from a traditional manufacturing organization. Some differences are discussed along with specific examples and experiences in one such company. The correct environment must exist to encourage creativity and innovation. In order for this organization to make a market and be profitable, the management approach must itself be innovative. (Author)

A78-49886 Managing interdisciplinary research teams. J. P. Martino (Dayton, University, Dayton, Ohio). In: NAECON '78; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 16-18, 1978. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1978, p. 280-285.

The use of interdisciplinary research teams is becoming more common, as problems become more complex and require the inputs and insights of several disciplines to provide solutions. However, the management of interdisciplinary teams presents some problems which are different from those encountered in managing single-disciplinary teams, or multi-disciplinary teams. Some of these problems arise from the interaction, within the team, of persons from different disciplines; other problems arise from the institutional framework in which the team must work. The manager responsible for leading interdisciplinary work should be aware of these problems, and of some of the means for solving them. (Author)

A78-49887 Systems engineering for management balance. R. J. Patton (Vought Corp., Dallas, Tex.). In: NAECON '78; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 16-18, 1978. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1978, p. 286-289.

Maintaining the proper engineering balance among technology, simplicity, producibility, supportability, and cost has become the major challenge in sophisticated development projects. The practice of systems engineering has evolved as a means of accomplishing this balance. By relating a realistic assessment of performance, reliability, cost, maintainability, etc. to the original specification, the systems engineer provides the tool to bring the design into harmony with the requirement. By providing better balance and visibility for engineering management, systems engineering permits better commitments of resources and, hence, saves manhours. V.P.

A78-49947 Reliability as a dynamic system development tool. J. L. Easterday (Battelle Columbus Laboratories, Columbus, Ohio). In: NAECON '78; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 16-18, 1978. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1978, p. 851-859. 12 refs.

A description is presented of a program concerned with the determination of system reliability and maintainability. The results of the program show that it is feasible and practical to model and estimate the reliability, maintainability, and cost of a system in the advanced development stage. Meaningful information could be extracted from actual field tests which were not basically designed to yield data directed toward statistical analysis. An interesting concept of a quasi-Bayesian combination of theoretical and field data has been developed and implemented with encouraging results. It is anticipated that the described methodology and program activity will result in direct guidance for system improvement, and the specification of maintainability requirements for the next generation of equipment. G.R.

A78-49958 Making an HOL vs MOL decision - An alternate approach. R. Palmer (Computer Sciences Corp., Moorestown, N.J.). In: NAECON '78; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 16-18, 1978. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1978, p. 941-944. 11 refs.

In the present paper, a technique is proposed which may help the software manager to decide whether to use a high-order language (HOL) or a machine oriented language (MOL) in a particular project. The technique is project oriented and is based on simple probabilistic

considerations. It allows the manager to make his own estimates of the economic tradeoffs involved, using the best data available to him. V.P.

A78-49969 System avionics value estimation /SAVE/ - A new tool for logistics and support cost analyses. R. L. Harris (USAF, Avionics Laboratory, Wright-Patterson AFB, Ohio) and T. R. Cork (Battelle Columbus Laboratories, Columbus, Ohio). In: NAECON '78; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 16-18, 1978. Volume 3.

New York, Institute of Electrical and Electronics Engineers, Inc., 1978, p. 1073-1077. 7 refs.

The SAVE program performs logistic support analysis for avionics using a hierarchy of five special-purpose logistic and support cost models integrated within an interactive framework. The computer framework permits the following: (1) user definition of the hardware configuration up to five levels of indenture, (2) establishment of one consistent data-file for the entire set of models, (3) on-line descriptions of each data item's utilization of the available models, (4) use of an appropriate model for the problem being analyzed, (5) on-line graphical presentation of results, and (6) adaptability to add models beyond the initial set of five. B.J.

A78-49993 # Motivating contractors to improve avionics reliability and life cycle cost. M. B. Lovelace (USAF, Air University, Maxwell AFB, Ala.). In: NAECON '78; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 16-18, 1978. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1978, p. 1239-1245. 25 refs.

A majority of decisions impacting avionics life cycle costs are made by planners and managers in the strategy formulation period early in each program. These planners must be informed of the effects their decisions have on competition and contractor motivation to improve avionics reliability and life cycle costs. This paper surveys avionics studies and reports for Government and industry suggestions for improving contractor motivation. This review provides program managers and planners at all levels an appreciation for various suggested strategies and viewpoints. It provides an historical perspective which should result in better understanding during future avionics programs. (Author)

A78-50006 # The development of a computer software management discipline. S. C. Gordon (USAF, Systems Command, Andrews AFB, Md.). In: NAECON '78; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 16-18, 1978. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1978, p. 1345-1354. 19 refs.

The paper defines the concept of a new software management discipline for Air Force defense system acquisitions. The discipline consists of three organic elements; policy, practice, and technology. The discipline should lead to an effective computer software engineering process model and a documentation standard to support the model. P.T.H.

A78-51622 # Quality assurance in R & D. G. W. Roberts (Babcock and Wilcox Alliance Research Center, Alliance, Ohio). *Mechanical Engineering*, vol. 100, Sept. 1978, p. 41-45.

The first step in the establishment of a quality assurance (QA) system involves the hiring of a quality assurance manager. The second step is to decide if an outside consultant can be of assistance. Because of their extensive experience, consultants can identify, develop, and write any type of program needed in a short time. One of the key documents in any QA program should be the QA manual. It must be decided whether it should be a policy manual or a more specific 'working manual'. Implementing procedures should be written by the persons who are most affected by them. Planning is the most critical phase of the project; it is also the most difficult discipline to establish in a research environment. Attention is also given to the implementation concept, generic systems, project management, and the responsibilities of the QA organization. G.R.

A78-53447 Systems engineering: Methodology and applications. Edited by A. P. Sage (Virginia, University, Charlottesville, Va.). New York, IEEE Press, 1977. 407 p. $29.95.

An introduction to systems engineering methodology and applications is given and a methodological framework for systems engineering is provided. Planning, policy analysis, and value system design are considered along with structural models, problems of decision making, the application of systems engineering methodology to energy, the application of systems engineering methodology to medicine and health, and applications to technology forecasting and assessment. Aspects of simulation and modeling are discussed, taking into account systems analysis as a tool for urban planning, an introductory world energy model, a parameter identification for simulation models of human behavior, economic models, an input-output economic analysis of environmental impact, input-output models in economic and environmental policy analyses, and optimization and interaction of an economic and sociological model. Attention is also given to the application of systems engineering methodology to resource and land use. G.R.

STAR ENTRIES

N78-10713# Defense Systems Management School, Fort Belvoir, Va.

SOFTWARE MANAGEMENT: APPLYING HARDWARE DISCIPLINES TO SOFTWARE MANAGEMENT Student Project Report

Lee A. Anderson Nov. 1976 36 p refs

(AD-A041887) Avail: NTIS HC A03/MF A01 CSCL 05/1

After an introduction, this study report discusses the acquisition life cycle. The report outlines how a life cycle should be used to manage the acquisition of software. Configuration management is introduced by relating the configuration management baselines to the life cycles. It further discusses the *configuration management functions of configuration identification,* configuration control, and configuration status accounting. The report strongly supports the use of configuration management as a discipline in the management of software. The report next discusses the use of technical reviews and audits in the management of software. Finally the report discusses what data must be procured to support a software system. The general conclusion of the report is that hardware disciplines can and should be adapted and used in the management of software. The author used documents published by the Department of Defense and the United States Air Force as guidance in presenting the material. However, the author attempted to write the report in general terms so that Navy and Army personnel, along with Air FOrce personnel could read and understand the report. Also, the author hopes that persons familiar with the acquisition of hardware, but not software, could read this report and begin to understand software management. Author (GRA)

N78-10750# Doty Associates, Rockville, Md.

SOFTWARE COST ESTIMATION STUDY. VOLUME 1: STUDY RESULTS Final Technical Report, 23 Feb. 1976 - 23 Feb. 1977

J. H. Herd, John N. Postak, William Russell, and Kenneth R. Stewart Griffiss AFB, N. Y. RADC Jun. 1977 214 p refs (Contract F30602-76-C-0182)

(AD-A042264; TR-151; RADC-TR-77-220-Vol-1) Avail: NTIS HC A10/MF A01 CSCL 09/2

The study identified factors that have an adverse effect on software cost estimates, determined their impact on software cost estimates, discussed methods for controlling the effect of these factors, and developed an overall methodology for estimating the costs of software development. In addition to a generalized model for estimating software development costs, separate models have been generated for estimating the development cost of command and control, scientific, utility, and business software. Author (GRA)

N78-10946*# Pepperdine Univ., Los Angeles, Calif. School of Business and Management.

WHO SHOULD CONDUCT AERONAUTICAL R AND D FOR THE FEDERAL GOVERNMENT?

H. Harvey Album Aug. 1977 219 p refs

(Grant NsG-2159)

(NASA-CR-152021) Avail: NTIS HC A10/MF A01 CSCL 05A

It was found that Government laboratories, and especially NASA laboratories, should be the prime national producers of applied research in aeronautics. American aeronautic needs the new stimulus of markedly increased outputs of broad-based innovative research from NASA laboratories more than it needs most of the technology advancement and development-oriented programs currently underway in these laboratories. The Government should use manufacturing companies for the vast bulk of development and most technology advancement. However, the Government will have to implement programs to encourage the *transfer of full information on technology and research advance*ments, from the companies that do this work for the Government, to competing companies. Universities should be the primary sources of basic research. Service R&D companies and non-profit R&D institutions provide valuable, specialized, supplementary technical capabilities and other unique attributes, which together span the entire spectrum of aeronautical R&D. Author

N78-10947*# National Aeronautics and Space Administration, Washington, D. C.

OFFICE OF UNIVERSITY AFFAIRS MANAGEMENT INFORMATION SYSTEM: USERS GUIDE AND DOCUMENTATION

Judy Distin, Doris Goodwin, and W. A. Greene Sep. 1977 383 p refs

(NASA-TM-78422) Avail: NTIS HC A17/MF A01 CSCL 05A

Data on the NASA-University *relationship are reported that* encompass research in over 600 schools through several thousand grants and contracts. This user-driven system is capable of producing a variety of cyclical and query-type reports describing the total NASA-University profile. The capabilities, designed as part of the system, require a minimum of user maintenance in order to ensure system efficiency and data validity to meet the recurrent Statutory and Executive Branch information requirements as well as ad hoc inquiries from NASA general management, Congress, other Federal agencies, private sector organizations, universities and individuals. The data base contains information on each university, the individual projects and the financial details, current and historic, on all contracts and grants. Complete details are given on the system from its unique design features to the actual steps required for daily operation. Author

N78-10948# Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio.

AIR FORCE FLIGHT DYNAMICS LABORATORY FISCAL YEAR 1978 TECHNICAL OBJECTIVE DOCUMENT

Jan. 1977 58 p Supersedes AFFDL-TR-76-18

(AD-A042363; AFFDL-TR-77-33) Avail: NTIS HC A04/MF A01 CSCL 01/3

The document presents an overview of the four Technical Planning Objectives and supporting data for each. These are extracted from the technical plan of the Air Force Flight Dynamics Laboratory (AFFDL). Information is largely based on AFFDL fiscal 1978 technology plan omitting specific funding and timing information of an 'Official Use Only' nature. Technical objectives are described for the technical areas of Structural Mechanics, Vehicle Equipment/Subsystems, Flight Control and Aeromechanics. Points of contact for more information in each of the areas are identified. Author (GRA)

N78-10949# Office of the Project Manager Selected Ammunition, Dover, N. J.

A COMPUTER PROGRAM FOR TRACKING COST/SCHEDULE CONTROL SYSTEMS CRITERIA Final Report

Louis M. Smith Jun. 1977 98 p refs

(AD-A042314; PMSA-2-5) Avail: NTIS MF A01 CSCL 14/1

Report describes a computer program that provides a means for tracking contractor's performance where Cost/Schedule Control Systems Criteria are utilized. The program was specifically designed for the CDC 6500/6600 computer at USA Armament Research and Development Command, Dover, N.J. Input data *are those normally found in a contractor's Cost Performance* Report. Program output is a series of Cost and Schedule Performance Index graphs, a summary variance graph, and a set of tables. Author (GRA)

N78-10950# Defense Systems Management School, Fort Belvoir, Va.

CLASS V MODIFICATION MANAGEMENT AND PLANNING: A GUIDE FOR THE AFSC PROGRAM MANAGER OF LESS-THAN-MAJOR SYSTEMS

Reginald M. Cilvik May 1977 62 p refs

(AD-A042941) Avail: NTIS HC A04/MF A01 CSCL 05/1

The primary goal of the report is to provide the AFSC program manager (PM) of less-than-major systems with an understanding of the importance of the early planning interface required between the AFSC PM, AFLC agencies, and higher headquarters; and the impact of the PM in the implementation of Class V modifications. The author first summarizes the current DOD and Air Force documentation which provides data for basic authority and establishes policies for Class V modifications. He outlines typical interfaces between the AFSC program office, AFLC agencies, and HQ USAF that are required for AFLC-managed Class V modifications. Next, he provides a brief overview of the DOD Planning Programming, and Budgeting System (PPBS) and illustrates the importance of lead timing for the modification budget submission within PPBS. The different procurement appropriations, Class V modification budget program monies, and planning documentation are summarized. Problem areas in modification management are discussed, based on interviews with AFSC and AFLC personnel. General guidelines are established to assist the AFSC PM to accomplish his program more effectively through better understanding of the Class V modification process. Such improved understanding should facilitate the transition from an RDT/E program to a Class V modification program. GRA

N78-10951# Defense Systems Management School, Fort Belvoir, Va.

USING COST ANALYSIS TO BREAK THE OVERRUN HABIT

Richard William Grimm May 1977 100 p

(AD-A042935) Avail: NTIS HC A05/MF A01 CSCL 14/1

This report is a treatise on cost analysis and cost management intended primarily to orient personnel unfamiliar with them. Major factors contributing to program cost problems are highlighted. The results of several studies on cost growth are portrayed, and several recommendations are made for controlling cost. Cost analysis responsibilities and methodology are presented in detail and examples are used. Parametric methodology is emphasized heavily as this is the government's primary technique. Analytical and institutional problems are discussed and on-going research to solve them is described. The report closes with a discussion of how the program director and cost analysts can work together to help break the overrun habit. Author (GRA)

N78-10952# Defense Systems Management School, Fort Belvoir, Va.

GRAPHICAL EVALUATION AND REVIEW TECHNIQUE (GERT): A STOCHASTIC NETWORKING SCHEME FOR SYSTEMS ACQUISITION MANAGEMENT

Earle Howard Helgerson May 1977 67 p refs

(AD-A042934) Avail: NTIS HC A04/MF A01 CSCL 05/1

This study is designed to acquaint members of the Defense Systems Acquisition Management Community with the fundamental operating characteristics of a stochastic networking simulation scheme known as GERT (Graphical Evaluation Review Technique). The development of GERT has been structured around a conceptual framework supported principally by the PERT networking technique. Primarily geared to satisfying management needs, the evolution of GERT demands a minimum amount of technical expertise necessary to comprehend the fundamental concepts. The principal theme of the study evolves about the ability of GERT to accommodate the realities associated with uncertainty, risk and variability which clearly separates it from the classical critical path networking models. Supporting this notion, the study discusses the stochastic realities that the DOD Program Manager must contend with on a daily basis. GRA

N78-10953# Bureau of the Census, Suitland, Md. Budget Div.

SUPPLIES INVENTORY, USER'S GUIDE

Apr. 1977 50 p

(PB-269609/4; CEN/DF-77/004a) Avail: NTIS HC A03/MF A01 CSCL 05A

A program is described for updating the consumable stock item inventory on a semi-monthly basis. The input is the receipt documents from vendors and the issue documents showing transfer of stock items to the open stock room and to specific divisions. During the update process the remaining balance on hand of each stock item is checked against a predetermined minimum balance and if quantity is less than the minimum balance, an order is automatically prepared. An undelivered order record for input to the accounting system is prepared whenever an order is placed. Charges for supplies used by each division are prepared during this process and entered into the accounting system monthly. GRA

N78-10974# General Accounting Office, Washington, D. C. Community and Economic Development Div.

CONTINUING NEED FOR IMPROVED OPERATION AND MAINTENANCE OF MUNICIPAL WASTE TREATMENT PLANTS: ENVIRONMENTAL PROTECTION AGENCY

11 Apr. 1977 83 p

(PB-268807/5; CED-77-46) Avail: NTIS HC A05/MF A01 CSCL 13B

Widespread operations and maintenance problems at 28 municipal waste treatment plants constructed with federal grants were studied. Inefficient plant operations are caused by and noted: (1) insufficient qualified plant-operating personnel; (2) inadequate budgets; (3) inadequate controls over industrial waste; (4) inadequate laboratory controls; (5) inadequate plant design and equipment; and (6) infiltration/inflow problems. GRA

N78-11257 American Metric Council, Washington, D. C.

METRICATION FOR THE MANAGER

John T. Benedict Sep. 1977 53 p refs

(LC-77-84932; ISBN-0-916148-12-2) Copyright. Avail: Issuing Activity

Metric conversion was viewed as a major long term project affecting every department in a company. The concept favored in metrication called for various functions and areas of responsibility to prepare their own plans and conduct their own programs based on corporate policy, a metric product plan, and a set of guidelines. The intent was to begin with a product-oriented changeover to metric measurement and assimilate the change gradually, over a suitable period of time, in a manner that would be least costly and disruptive. Author

N78-11861*+ National Aeronautics and Space Administration, Washington, D. C.

RESEARCH AND TECHNOLOGY OBJECTIVES AND PLANS. SUMMARY Research and Technology Program, FY 1978

1977 126 p

(NASA-TM-78623) Avail: NTIS HC E02 CSCL 05A

The NASA Research and Technology program for FY 1978 is represented by this compilation of the 'Summary' portions of each of the Research and Technology Objectives and Plans (RTOPS). The RTOP Summary is designed to facilitate communication and coordination among concerned technical personnel in government, in industry, and in universities. The first section contains citations and abstracts of the RTOPs. Following this section are four indexes: Subject, Technical Monitor, Responsible NASA Organization, and RTOP Number. Author

N78-11862# Duke Univ., Durham, N. C. Graduate School of Business Administration.

DECISION PROCESS MODELS OF PEER NOMINATIONS

Arie Y. Lewin 30 Jun. 1977 121 p

(Contract N00014-76-C-0007)

(AD-A043062; TR-2) Avail: NTIS HC A06/MF A01 CSCL 05/11

The objective of this research project is to develop an information processing theory of the judgemental process individuals engage in, while rating their peers. The complete research paradigm is described in Lewin and Zwany (1976). The approach taken was to utilize protocol tracing methods to construct decision process models of how individuals rate their peers for seven widely used sociometric questions: (1) Who would you go to for help on a tough problem; (2) Who is pulling most for the group; (3) Who was best at handling people; (4) Who has the most ability to think critically and analytically;

(5) With whom can you work best; (6) Who shows the greatest independence of thought; and (7) Who shows the best overall leadership qualities. The protocols revealed that individuals evaluated their peers along five primary behavior categories - (1) mutual influence, (2) categorizing-summarizing, (3) having a comprehensive view, (4) giving direction, and (5) listening. The detailed protocols were then used to develop a scoring method of videotaped group interactions which included content scoring of the verbal interactions and the non-verbal behavior (i.e. head nodding, eye contact, openness, etc.). GRA

N78-11863# Stanford Research Inst., Menlo Park, Calif.
PRELIMINARY ASSESSMENT FOR DESIGNING EXPERIMENTS USING FEDERAL INNOVATION PROCESSES
Charles Williams, Egils Milbergs, and Robert Quick Apr. 1977 303 p
(Contract NSF C-828)
(PB-270089/6; CSSP-4676-14; NSF/RA-770121) Avail: NTIS HC A14/MF A01 CSCL 05A

The groundwork for a practical approach for systemically monitoring and evaluating naturally occurring federal innovation processes was established. A natural experimental approach that potentially can provide a cost effective strategy for evaluating the impact of alternative federal technology incentives was studied. The frameworks presented provide a set of tools to help evaluators to begin to describe the federal innovation process for individual cases and the components that affect each case. GRA

N78-11864# International Institute for Applied Systems Analysis, Laxenburg (Austria).
MULTI-ORGANIZATIONAL STRATEGIES: AN ANALYTIC FRAMEWORK AND CASE ILLUSTRATIONS
Cyril Davies, Ada Demb, Raul Espejo, and Roman Ostrowski Feb. 1977 33 p refs
(IIASA-RM-77-4) Avail: NTIS HC A03/MF A01

An analytical framework to support organizational strategies for the planning and management of multi-sectoral programs is presented. Two different case studies are reported. The first is concerned with the 'Impacts of Oil Development Offshore of the Northeast Coast of Scotland'. While some findings specific to Scotland are presented, stress is laid on conveying the methodology developed to study the orgranizational dimension of large development programs. This methodology is used in the second case study, the 'Bratsk-Ilimsk Territorial Production Complex', to analyze a particular policy issue presently under consideration by Soviet policy makers, namely, the need for new management mechanisms to support the present evolution of territorial production complexes. Author (ESA)

N78-11893# Harvard Univ., Cambridge, Mass. Landscape Architecture Research Office.
MANAGING SUBURBAN GROWTH: A MODELING APPROACH
Carl H. Steinitz, James Brown, and Peter Goodale 1977 62 p
(Grant NSF EVN-72-03372-A06)
(PB-270113/4; NSF/RA-770119) Avail: NTIS HC A04/MF A01 CSCL 13B

Tools for managing the rapid growth of suburban areas and a system for analyzing the effectiveness and consequences of planning strategies were developed. The pressures and consequences of suburban growth are described in a system of computer models. The individual models are operated separately to address a specific task, or linked to respond to more complex questions beyond the scope of any single model. The models exchange information through a shared computer programming system and a common data base. GRA

N78-12133*# National Aeronautics and Space Administration, Washington, D. C.
REPORT ON NASA FIVE-YEAR PLANNING, FISCAL YEARS 1978 THROUGH 1982
Philip E. Culbertson *In* Comm. on Sci. and Technol. (U. S. House) Space Transportation System 1977 p 313-402 refs Avail: Subcomm. on Space Sci. and Applications CSCL 22A

This plan is NASA's initial description of its projected research and development activities for the years 1978 through 1982. Stated goals are: (1) assurance of U.S. Preeminence in aviation, (2) scientific exploration of the universe, (3) global information services, and (4) permanent U.S. presence in space. The program represents a budget increase in NASA's aeronautical and space research and development of between three and four percent per year in terms of FY 1978 dollars. Author

N78-12724# Doty Associates, Rockville, Md.
SOFTWARE COST ESTIMATION STUDY. VOLUME 2: GUIDELINES FOR IMPROVED SOFTWARE COST ESTIMATING *Final Technical Report, 23 Feb. 1976 - 23 Feb. 1977*
D. L. Doty, P. J. Nelson, and Kenneth R. Stewart Griffiss AFB, N. Y. RADC Aug. 1977 148 p
(Contract F30602-76-C-0182)
(AD-A044609; TR-151-Vol-2; RADC-TR-77-220-Vol-2) Avail: NTIS HC A07/MF A01 CSCL 09/2

This report contains guidelines for developing estimates of computer software cost. Consideration is first given to the initial program estimate which is often made with a paucity of supportive data. Adjustments are presented for modifying the estimate given the availability of additional data. Procedures are presented for assessing the affordability of the resulting estimates. Emphasis is placed on developing a conservative but reasonable best estimate for purposes of program budgeting. Separate consideration is given to steps that should be taken to bring the program in at or below budget. Frequently recurring problems are summarized in their time-phased order of occurrence.
Author (GRA)

N78-12891# Stanford Univ., Calif. Dept. of Statistics.
MANAGEMENT STRATEGIES IN FIXED-STRUCTURE MODELS OF COMPLEX ORGANIZATIONS
Crayton C. Walker and Alan E. Gelfand 14 Mar. 1977 32 p refs
(Contracts N00014-76-C-0475; Grant DAAG29-77-G-0031)
(AD-A044899; SU-TR-243) Avail: NTIS HC A03/MF A01 CSCL 12/2

The organizational analogues corresponding to a binary switching net models provide useful insight into the behavior of complex organizational control systems. Imposition of certain types of structure on the responses of elements in a system to their inputs enables control of the overall behavior of such nets to an extent that makes them plausible as real world models. Two such structural concepts are examined, internal homogeneity and forcibility, with respect to their influence on the behavior of individual elements and of the system as a whole. These two concepts are interpreted as managerial strategies, the former being management by exception and the latter being management by priority. Author (GRA)

N78-12892# Massachusetts Inst. of Tech., Cambridge. Operations Research Center.
HIERARCHICAL PRODUCTION PLANNING SYSTEMS
Arnold C. Hax and Jonathan J. Golovin Aug. 1977 37 p refs
(Contract N00014-75-C-0556)
(AD-A045016; TR-135) Avail: NTIS HC A03/MF A01 CSCL 05/1

This report describes the development of hierarchical planning systems to support medium range planning and operational decisions in a batch processing production environment. In this approach, higher level decisions impose constraints to lower level actions, and lower level decisions provide the necessary feedback to reevaluate higher level actions. An analysis of the existing methodology to design hierarchical production systems is given. Computational results are presented. GRA

N78-12893# Michigan Univ., Ann Arbor. Inst. for Social Research.
FUTURE PERFORMANCE TREND INDICATORS: A CURRENT VALUE APPROACH TO HUMAN RESOURCES ACCOUNTING. REPORT 4: AN EXAMINATION AND EVALUATION OF THE STATISTICAL MODEL

Alan S. Davenport, Jean B. Lapointe, and David G. Bowers Jun. 1977 642 p refs
(Contract N00014-76-C-0362; NR Proj. 156-015)
(AD-A045068) Avail: NTIS HC A99/MF A01 CSCL 05/9

This report uses predictive relationships between the Survey of Organizations and measures of organizational effectiveness established in earlier reports (Pecorella and Bowers, 1976a, 1976b, 1977) (AD's A037 733, A033 608, and A036 907), to develop the formal equations, including parameter values, to be used in the value attribution phase. Preliminary to this a series of issues arising from the theoretical and statistical bases of the current value approach are examined. These include: characteristics of variables to be included in the model, assumptions required for prediction of future performance, extension of the univariate methodology to the multivariate case, and the consequences of applying the methodology to this particular data file, for example, standardization of variables and elimination of outliers. A summary of previous and current analyses is also provided. A particular issue is how well the assumptions underlying the multivariate model are met in this particular data file. Analyses show there is no reason to believe the assumptions of multivariate linearity and normality are not met. Other analyses show that one cannot significantly reduce the number of predictor variables in the model. It is concluded that the presented model is appropriate, and the data set is ready to begin the value attribution steps. GRA

N78-12900# DRC Inventory Research Office, Philadelphia, Pa.
BARE BONES: A METHOD FOR ESTIMATING PROVISIONING BUDGET REQUIREMENTS IN THE OUTYEARS Final Report
Donald A. Orr Jul. 1977 48 p refs
(AD-A044508; IRO-242) Avail: NTIS HC A03/MF A01 CSCL 05/1

Different methodologies and procedures are currently used by Project Managers/Commodity Commands in the Army to estimate initial provisioning funding requirements early in the development cycle of a system/end item. These estimates are to project support costs 1-5 years hence, but there has been a lack of quality, uniform methodology, and defensible rationale in the estimates. This paper develops a prototype methodology that reflects, early on, the quantities and costs that would be determined ultimately using the Standard Initial Provisioning model (SIP) just prior to the deployment of the end item in the budget execution year. An important pillar of the new procedure is a cumulative cost curve, generated from the provisioning costs of a small percentage of the total components, from which extrapolations are made of the total provisioning costs for the system. Selection of critical components is made by ranking parts by replacements per 100 end items x component unit price. GRA

N78-12903# Transportation Systems Center, Cambridge, Mass.
SERVICE AND METHODS DEMONSTRATION PROGRAM Final Report, Jul. 1975 - Oct. 1976
Donald Kendall Apr. 1977 566 p
(PB-270673/7; DOT-TSC-UMTA-77-20;
UMTA-MA-06-0049-77-2) Avail: NTIS HC A25/MF A01 CSCL 13B

Urban transportation systems designed to decrease transit travel time, increase transit reliability, increase transit coverage, increase transit vehicle productivity, and improve the mobility of transit dependents are evaluated. Independent activities carried out in support of the demonstrations are described, such as the development of evaluation guidelines and improved methodologies for demonstration evaluation, analytical studies in support of the development of experimental demonstrations, studies of independent local innovations, and case studies of transit operations in small communities. GRA

N78-12913# Department of Transportation, Washington, D. C. Office of the Secretary.
DEPARTMENT OF TRANSPORTATION BUDGET PROGRAM: ANALYSIS OF FISCAL YEAR 1978 DOT PROGRAM BY POLICY AND RD AND D MANAGEMENT OBJECTIVES. PROGRAM LEVELS FOR FISCAL YEARS 1976, 1977, 1978
Robert L. Paulin, Ira Dye, and Phillip H. Bolger 15 Jun. 1977 456 p refs
(PB-270676/0; DOT-OST-77-1) Avail: NTIS HC A20/MF A01 CSCL 13B

A synopsis of the total budget program of the Department of Transportation (DOT) is summarized. The Research, Development and Demonstration (RD&D) and grant programs in terms of DOT policy and RD&D management objectives and other classification structures are summarized. Program information is presented for 1976 through 1978, including the 1976 to 1977 transition quarter. Communication between the various elements of DOT and other sectors of transportation, both public and private is emphasized, so as to obtain more benefits to the nation from the investments being made in transportation research. GRA

N78-13729# Oak Ridge National Lab., Tenn. Industrial Hygiene Dept.
MATERIALS SAFETY DATA SHEETS: THE BASIS FOR CONTROL OF TOXIC CHEMICALS, VOLUME 2
N. E. Bolton, E. E. Ketchen, W. E. Porter, and C. L. Hunt May 1977 558 p refs
(Contract W-7405-eng-26)
(ORNL/TM-5722) Avail: NTIS HC A24/MF A01

For abstract, see N78-13730.

N78-13730# Oak Ridge National Lab., Tenn. Industrial Hygiene Dept.
MATERIALS SAFETY DATA SHEETS: THE BASIS FOR CONTROL OF TOXIC CHEMICALS, VOLUME 1
N. E. Bolton, E. E. Ketchen, W. E. Porter, and C. L. Hunt May 1977 482 p refs
(Contract W-7405-eng-26)
(ORNL/TM-5721-Vol-1) Avail: NTIS HC A21/MF A01

For large industrial and research operations, maintaining reasonable control of all toxic materials used in their operations can be a formidable task. A system utilizing cards has been developed that serves a dual purpose, informing the user regarding hazards of a particular material and also facilitating appropriate workplace surveillance during its use. Selected data, including threshold limit values, routes of absorption, symptoms of exposure, chronic effects, and emergency first-aid procedures, are printed on the card. A portion of the card contains the label that the user detaches and affixes to the container. This label classifies the material according to flammability, toxicity, reactivity, and special properties on a 0 through 4 hazard rating system. This report describes the development and use of such cards, contains the associated toxic material data sheets that provide full backup data for the labels, and furnishes a glossary of biomedical terms used in the data sheets. ERA

N78-13755# Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
AN ANALYSIS OF COMPUTER DECENTRALIZATION B.S. Thesis
Cecilia R. DOliveira Oct. 1977 64 p refs
(Contract N00014-75-C-0661; ARPA Order 2095)
(AD-A045526; MIT-LCS-TM-90) Avail: NTIS HC A04/MF A01 CSCL 09/2

The author conjectures that there are strong forces in many organizations leading towards computer facility decentralization, which have been held in check by technological and economic constraints that are beginning to relax. This conjecture is explored by analyzing approximately forty case studies of decentralization decisions. Results indicate that (1) strong decentralization forces exist in many organizations. The forces derived from these particular case studies are classified as either functional, economic or psychological. (2) The drop in hardware costs allows decentralization to occur at the initiative of lower level managers. The consequences of this trend could include disintegration of the organization's information system. Decisions by lower level

managers may overlook the technological constraints of decentralization, especially the problems of networking loosely coupled computers. This could result in a future inability to share data or programs among organizational units. Because of the many functional advantages it provides, management should not discourage decentralization; however, top level management must be aware that technological constraints require that decentralization occur with their guidance and their perspective of the entire organization. GRA

N78-13773# National Bureau of Standards, Washington, D. C. Inst. for Computer Sciences and Technology.
A SURVEY OF ELEVEN GOVERNMENT-DEVELOPED DATA ELEMENT DICTIONARY/DIRECTORY SYSTEMS
Hazel McEwen Aug. 1977 114 p
(PB-270724/8; NBS-Special Pub-500-16; LCC-77-608155) Avail: NTIS HC A06/MF A01 CSCL 09B

The current state-of-the-art of government developed Data Element Dictionary/Directory (DED/D) systems is presented. DED/D's are software tools used for managing and controlling information and data. Eleven DED/D systems are described, first using a side-by-side features presentation approach, and followed by narrative systems descriptions which highlight special capabilities and experiences with each system. GRA

N78-13941# General Accounting Office, Washington, D. C. Procurement and Systems Acquisition Div.
SHARING THE DEFENSE BURDEN: THE MULTINATIONAL F-16 AIRCRAFT PROGRAM
15 Aug. 1977 46 p
(PB-271251/1; PSAD-77-40) Avail: NTIS HC A03/MF A01 CSCL 05A

Progress made in implementing the F-16 multinational aircraft program is discussed. In view of the complexity of the F-16 multinational program, and the inherent problems in any European coproduction, it is to be expected that a variety of critical issues will surface as the program matures. The current most critical issues which could have an impact on the program are described as well as the relationship established between the United States and the European Participating Governments. GRA

N78-13942# Health Effects Research Lab., Research Triangle Park, N. C. Criteria and Special Studies Office.
MANAGEMENT POLICY FOR THE ASSURANCE OF RESEARCH QUALITY, HEALTH EFFECTS RESEARCH LABORATORY, RESEARCH TRIANGLE PARK, NORTH CARCLINA
Jun. 1977 34 p refs
(PB-270978/0; EPA-600/1-77-036) Avail: NTIS HC A03/MF A01 CSCL 05A

Policies, goals, and an organizational structure for the implementation of a management policy are presented. Directed toward functional managers, a system for quality assurance monitoring of task quality control functions is described. General areas affecting data quality are discussed from the perspective of the manager as a reviewer of documents or plans. The application of quality assurance measures is the responsibility of taskmasters or project officers. It is the responsibility of functional management to ensure that all project-oriented documents or plans have incorporated appropriate quality assurance procedures. GRA

N78-13943# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
THE DIMENSIONALITY AND EFFECTIVENESS OF INFLUENCE METHODS USED IN A MATRIX ORGANIZATIONAL ENVIRONMENT M.S. Thesis
Richard C. Leclaire Sep. 1977 103 p refs
(AD-A045878; AFIT-GSM/SM/77S-10) Avail: NTIS HC A06/MF A01 CSCL 12/2

The matrix organization generate authority ambiguity whereby there is multiple supervision of project personnel. Further, the project manager has much less authority than responsibility. To compensate for this, a variety of influence methods are used. The purpose of this study is to investigate the independence and the effectiveness of the influence methods used by project and functional managers in the matrix organizational environment. To accomplish this, 264 personnel answered a questionnaire. These personnel were in six different System Program Offices at Wright-Patterson Air Force Base. The questionnaire dealt with six different effectiveness variables and ten influence methods, and the responses were subjected to a statistically based multivariate analysis. GRA

N78-13944# Harvard Univ., Cambridge, Mass.
STATUS OF RISK-BENEFIT ANALYSIS
A. J. VanHorn and R. Wilson Dec. 1976 31 p refs
(Contract EY-76-C-02-0016)
(BNL-22282) Avail: NTIS HC A03/MF A01

The benefits and deficiencies of cost benefit analysis are reviewed. It is pointed out that, if decision making involving risks and benefits is to improve, more attention must be paid to the clear presentations of the assumptions, values, and results. Reports need to present concise summaries which convey the uncertainties and limitations of the analysis in addition to the matrix of costs, risks, and benefits. As the field of risk-benefit analysis advances the estimation of risks and benefits will become more precise and implicit valuations will be made more explicit. Corresponding improvements must also be made to enhance communications between the risk-benefit analyst and the accountable decision maker. ERA

N78-13946# Bridgeport Univ., Conn.
INITIAL IMPLEMENTATION FOR A DATA MANAGEMENT SYSTEM Final Report
Stanley Schenkerman 1 Feb. 1977 109 p refs Prepared for League of Cities-Conf. of Mayors, Inc., Washington, D. C. and Higher Educ. Center for Urban Studies, Bridgeport, Conn.
(Contract HUD-H-2196R)
(PB-270717/2; UO-LCCM-BRI-77-008; HUD-RES-1115) Avail: NTIS HC A06/MF A01 CSCL 05B

The initial phases of the design and development of a data management system for the city of Bridgeport were conducted. The work had to be performed with minimal use of the city's computer resources and minimal encroachment on the data processing staff's time. The project brought the data base and corresponding application programs design and coding to the ready-for-debug state. This state is the starting point for the next phase, the follow-on project which has already been planned and scheduled. GRA

N78-13949# Colorado State Univ., Fort Collins.
ORGANIZATION AND PERSONNEL MANAGEMENT FOR EFFECTIVE INTERDISCIPLINARY RESEARCH Final Report, 1 Sep. 1974 - 28 Feb. 1977
Douglas A. Benton, James R. Meiman, Daryl B. Simons, Douglas D. Sjogren, and Donald C. Taylor Feb. 1977 349 p refs
(Grants NSF RMI-74-22728; NSF NM-44411)
(PB-271796/5) Avail: NTIS HC A15/MF A01 CSCL 05A

The objectives of this project were to: (1) develop a workable evaluation system for large-scale interdisciplinary research (LSIDR) projects, and (2) investigate the linkages between effectiveness and management characteristics of these large-scale projects. A case study approach was used on six large-scale projects within Colorado State University. GRA

N78-13957*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
BALTIMORE APPLICATIONS PROJECT Annual Progress Report
Tom Golden Jun. 1977 31 p refs
(NASA-TM-78021; APR-3) Avail: NTIS HC A03/MF A01 CSCL 05A

The program to assist the City of Baltimore with technology of all types has completed its third year of operation. Some 43 task areas are discussed; the task identification is essentially complete. Author

N78-13960# Colorado State Univ., Fort Collins.
ON-LAND DISPOSAL OF MUNICIPAL SEWAGE SLUDGE: A GUIDE TO PROJECT DEVELOPMENT Interim Report
M. H. Lutkin, J. L. Smith, and D. B. McWhorter Jul. 1977 145 p refs
(Grant NSF AEN-74-08082)
(PB-271144/8; NSF/RA-770165) Avail: NTIS HC A07/MF A01 CSCL 13B

Computerized simulation of a hypothetical project is used to demonstrate to designers or administrators a procedure for bringing to fruition a proposed land application facility for municipal sewage sludge. Subjects discussed include permits and approval processes; pathogenic microorganisms; inorganic and organic contaminants; surface conditions that can be expected at a field location; a cursory discussion of anticipated subsurface conditions including groundwater and soil-water movement, soil properties, and procedures for obtaining data; and the effect of sludge application and climate on operation. GRA

N78-13973# Department of Transportation, Washington, D. C. Office of the Assistant Secretary for Systems Development and Technology.
THE URBAN CONSORTIUM AND ITS TRANSPORTATION TASK FORCE: A FEDERAL PERSPECTIVE Progress Report, Jan. 1975 - Jul. 1977
Alfonso B. Linhares Jul. 1977 24 p
(PB-271282/6; DOT-TST-77-45) Avail: NTIS HC A02/MF A01 CSCL 13B

An overview is given of the U.S. Department of Transportation's cooperative interactions with the Transportation Task Force of the Urban Consortium for Technology Initiatives. The Consortium is a coalition of 34 major urban governments which is developing an agenda of research, development, and demonstration needs and data packages in priority need areas. The report describes the logic which led to the formation of the Consortium, the various management mechanisms which evolved, the procurement and administrative approaches used, and the types of outputs which are being produced. GRA

N78-14933 British Library Lending Div., Boston Spa (England).
PROJECT MANAGEMENT FOR MEDIUM-SIZE UNDERTAKINGS: A MEANS OF ACHIEVING A MORE COMPETITIVE STATUS
E. Venten Oct. 1977 9 p refs Transl. into ENGLISH from Brau Industrie (West Germany), v. 62, no. 5, 1977 p 203-206
(BLL-RTS-10949) Avail: British Library Lending Div., Boston Spa, Engl.: £7.50; 7 BLL overseas, 8 European or 30 UK BLL photocopy coupons

The ways in which project management can be used in medium and small-sized undertakings are outlined. Characteristics pertinent to projects are given and a description is given of project management. Finally a functional analysis is presented of project management for medium-sized undertakings. L.S.

N78-15077*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
A LIFE CYCLE COST ECONOMICS MODEL FOR PROJECTS WITH UNIFORMLY VARYING OPERATING COSTS
D. S. Remer *In its* The Deep Space Network, Vol. 39 15 Jun. 1977 p 60-70 refs Prepared in cooperation with Harvey Mudd Coll., Claremont, Calif.

Avail: NTIS HC A09/MF A01 CSCL 05C

A mathematical model is developed for calculating the life cycle costs for a project where the operating costs increase or decrease in a linear manner with time. The life cycle cost is shown to be a function of the investment costs, initial operating costs, operating cost gradient, project life time, interest rate for capital and salvage value. The results show that the life cycle cost for a project can be grossly underestimated (or overestimated) if the operating costs increase (or decrease) uniformly over time rather than being constant as is often assumed in project economic evaluations. The following range of variables is examined: (1) project life from 2 to 30 years; (2) interest rate from 0 to 15 percent per year; and (3) operating cost gradient from 5 to 90 percent of the initial operating costs. A numerical example plus tables and graphs is given to help calculate project life cycle costs over a wide range of variables. Author

N78-15944# General Electric Co., Philadelphia, Pa. Re-entry and Environmental Systems Div.
RESEARCH AND DEVELOPMENT: AN IMPACT ON GROWTH
J. D. Stewart Dec. 1977 44 p refs
(Doc-77SDR037) Avail: GE Space and RESD Libraries, P.O. Box 8555, Philadelphia, Pa. 19101; HC $15.00/MF $15.00

NOTICE: Available to NASA Offices and NASA Research Centers.

A continuing study to evaluate the impact of research and development on growth and competitive posture was carried out and indicated that the well being of a company, industry and a country is strongly related to its commitment to research and development. The study used GNP as a base and evaluated the relationship between growth in GNP and impact on real earnings and on industrial productivity. A study of exports and imports for the United States was included, and a characteristic analysis of the United States was reviewed in detail, and GNP and research and development expenditures were evaluated. A major breakdown of the research and development in the primary fields of defense, space, other federal commitments and nonfederal expenditures was presented. The relationship of engineers and scientists engaged in research and development in the United States and their relationship with patents was also evaluated. Author

N78-15946# Stanford Research Inst., Menlo Park, Calif.
THE SCHEDULERS OF ACS.1
Marshall C. Pease Sep. 1977 114 p
(Contract N00014-77-C-0308; SRI Proj. 6289)
(AD-A046312; SRI-TR-14) Avail: NTIS HC A06/MF A01 CSCL 12/2

This report describes the design of the schedulers. It details the functions that implement the operations required of a scheduler, as well as discussing the reasons for the implementations chosen. In developing these implementations, a number of technical problems have been addressed and solutions developed. GRA

N78-15947# European Space Research and Technology Center, Noordwijk (Netherlands). Product Assurance Div.
QUALIFICATION OF PROCESSES AND PROCESS LISTS APPLICABLE TO SPACE PROJECTS
Paris ESA May 1977 14 p
(ESA-PSS-35/QRM-24-Iss-1) Avail: NTIS HC A02/MF A01

A specification is presented concerning the documentation system that must be applied to processes during the initial phases of any space project. The documentation considered consists of (a) preferred process lists and (b) declared process lists. Only those mentioned under (b) are a requirement imposed by ESA on its contractors. Preferred process lists, which contractors should establish to facilitate adherence to this requirement, are also dealt with, however. An interpretation of the term qualification is given. Author (ESA)

N78-15949# Naval Postgraduate School, Monterey, Calif.
TECHNICAL DEVELOPMENTS IN INFORMATION PROCESSING AND THE RESULTANT IMPACT ON USER ORGANIZATIONS M.S. Thesis
Charles J. Bannar, Jr. Sep. 1977 76 p refs
(AD-A046498; NPS-54CF77091) Avail: NTIS HC A05/MF A01 CSCL 05/2

This thesis has a basic hypothesis that previous failures of information systems in organizations are directly related to the disproportionately high amount of emphasis given to the technical aspects of data processing as compared to the inadequate attention and concern devoted by management, computer specialists, and users of information systems to critical behavioral issues. The behavioral issues presented are subunit conflicts,

training, skills, and perceptions of the participants, information sharing, power, and organizational politics. After reviewing the underlying reasons behind the lack of success achieved in the past, the organizational impact of fourth generation distributive processing techniques is predicted. A conflict and power model is presented that addresses the key organizational variables that prohibit successful information systems: design and development. Recommendations regarding operation, design, and organizational activities are presented with the goal of improving ultimate user satisfaction of data processing services.
Author (GRA)

N78-16026*# Boeing Vertol Co., Philadelphia, Pa.
RESEARCH REQUIREMENTS TO IMPROVE SAFETY OF CIVIL HELICOPTERS
Kenneth T. Waters Nov. 1977 77 p refs
(Contract NAS1-13624)
(NASA-CR-145620) Avail: NTIS HC A05/MF A01 CSCL 01C

Helicopter and fixed-wing accident data were reviewed and major accident causal factors were established. The impact of accidents on insurance rates was examined and the differences in fixed-wing and helicopter accident costs discussed. The state of the art in civil helicopter safety was compared to military helicopters. Goals were established based on incorporation of known technology and achievable improvements that require development, as well as administrative-type changes such as the impact of improved operational planning, training, and human factors effects. Specific R and D recommendations are provided with an estimation of the payoffs, timing, and development costs.
Author

N78-16070# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
AN ASSESSMENT OF RELEVANT DECISION MAKING FACTORS FOR ORGANIC VERSUS CONTRACT MAINTENANCE OPTIONS ON USAF FLIGHT SIMULATORS M.S. Thesis
Ronald J. Arceneaux and George E. Farsshman, Jr. Sep. 1977 137 p refs
(AD-A047136; AFIT-LSSR-7-77B) Avail: NTIS HC A07/MF A01 CSCL 05/1

Since the maintenance on flight simulators is reportably manpower intensive, the use of contract maintenance is often suggested. A taxonomy of relevant decision making factors was not available for the maintenance manager's use when evaluating the alternatives of contracting for maintenance or maintaining an organic capability. This research effort has identified some relevant decision making factors for a maintenance manager to consider when addressing the issue of contract maintenance versus organic maintenance at the organizational and intermediate level. The data were obtained from open-end interviews on which an analysis was performed utilizing a technique of behavioral research called semantic content analysis. The data analysis allowed for a determination of the relevant decision making factors and the subsequent recommendations on the development of a contract maintenance decision tree network. Basically, this decision tree would allow a manager to evaluate the options of contract maintenance versus organic maintenance, making a determination of which is optimal for the given situation. The factors identified by this research are considered to be cost drivers of the applicable maintenance option.
Author (GRA)

N78-16077# Range Commanders Council, White Sands Missile Range, N. Mex. Range Safety Group.
STATUS OF RANGE SAFETY FILTER SYSTEMS Final Report
Oct. 1977 119 p refs Supersedes IRMFSG-309-71
(AD-A047024; RSG-309-77; IRMFSG-309-71) Avail: NTIS HC A06 MF A01 CSCL 16/1

The goal of range safety is the prevention of injury to personnel or damage to property by taking all reasonable precautions consistent with operational requirements. This is dependent not only on precautions taken in the preparation of a missile or vehicle launch, but in the ability of the Range Safety Officer to maintain surveillance during flight to ensure compliance with established safety criteria. To maintain this necessary surveillance, the RSO must have at his disposal information depicting performance of the missile and possible impact locations for comparison against predetermined destruct criteria as well as assurance that his entire safety system is in operational condition at all times. Presenting this information in a manner that allows clear and quick understanding of significant data will vary due to missile dynamics and test range geometry. Therefore, there is no one-best filter for all applications. A survey of seven of the test ranges represented in the RSG of the RCC was made to determine the type of filter systems currently in use at the various ranges. This information is presented in this document as an aid to all ranges in determining which systems may have merit for their application and to provide some insight into future applications of filter systems.
Author (GRA)

N78-16223# National Commission on Electronic Fund Transfers, Washington, D. C.
THE EFFECT OF EXISTING LAW AND REGULATION ON THE OFFERING OF TELECOMMUNICATIONS SERVICES
Jun. 1977 19 p refs
(PB-272570/3; NCEFT-IWD-45) Avail: NTIS HC A02/MF A01 CSCL 17B

The statutory and regulatory environment for the offering of telecommunication services is described. Regulation by the Federal Communication Commission, pursuant to the Communications Act of 1934, as amended, 47 U.S.C.S151, et seq. (197), of entry to construct new transmission facilities or offer new services on an interstate communications common carrier basis, the development and sale of EFT terminals, and the pricing of common carrier services are discussed.
GRA

N78-16659# National Bureau of Standards, Washington, D. C. Technology Div.
COPYRIGHT IN COMPUTER-READABLE WORKS: POLICY IMPACTS OF TECHNOLOGICAL CHANGE Final Report
Roy G. Saltman Oct. 1977 271 p refs
(Grant NSF SIS-74-14168)
(PB-272789/9; NBS-SP-500-17; LC-77-14143) Avail: NTIS HC A12/MF A01 CSCL 09B

The findings, recommendations, and conclusions of a policy-oriented, multi-disciplinary study of copyright in computer-readable works are reported. The foundations of copyright are examined for basic principles, and the theory of public goods is applied to develop the rationale for copyright protection. The judicial history of copyright in the twentieth century is reviewed with respect to advances in information technology. The impact of technological change on judicial decision-making in copyright is analyzed. The problem of transaction costs for copyrighted works is examined, and models of policymaking are developed.
GRA

N78-16910 California Univ., Los Angeles.
TECHNICAL RISK MANAGEMENT IN ADVANCED TECHNOLOGY DEVELOPMENT Ph.D. Thesis
James C. Riple, Jr. 1977 345 p
Avail: Univ. Microfilms Order No. 77-23917

Technical risk management was defined as the presence of significant technical uncertainty at the begining of a technology development program. This uncertainty is manifested in a risk of wasting the resources invested in the program. The invested resources must be managed in their relationship to technical uncertainty in order to limit the program risk to an acceptable level. This investigation covers as a series of personal interviews with a number of technical leaders in the advanced technology development field. Other data were developed by recasting and integrating data from the engineering, systems, management and behavioral sciences literature.
Dissert. Abstr.

N78-16911 Ohio State Univ., Columbus.
COMPUTER OPERATING SYSTEM FACILITIES FOR THE AUTOMATIC CONTROL AND ACTIVITY SCHEDULING OF COMPUTER-BASED MANAGEMENT SYSTEMS Ph.D. Thesis
Dov Isaacs 1977 254 p
Avail: Univ. Microfilms Order No. 77-24643

The role of computer operating systems was extended from job supervision into the realm of automatic control and activity scheduling of computer-based management systems. Primary emphasis was placed on the functional specification of a model for a computer operating system with the capability of automatic control and activity scheduling of computer-based management systems. The technology of the traditional job processing operating system was extended to provide operating system services directly at the integrated application system level as well as at the existing component job level. Dissert. Abstr.

N78-16912 Rochester Univ., N. Y.
THE EFFECTS OF NOMINAL AND BRAINSTORMING DECISION-MAKING PROCEDURES ON GROUP PRODUCTIVITY Ph.D. Thesis
Larry Dean Eldridge 1977 145 p
Avail: Univ. Microfilms Order No. 77-16221

Group decision-making and productivity are investigated together; studying the impact of various decision-making procedures on the total process, from the formulation of the problem to the implementation of the final solution. Forty-nine 4-person groups of undergraduate volunteers followed three different decision-making procedures to arrive at a solution to the Lego Block Tower task and then implemented their solution. Both commitment to carry out the decision and decision quality were found to be associated with productivity. Productivity was predicted significantly better by an additive regression model using commitment and decision quality as the predictors than by a multiplicative model using the product of commitment and decision quality as the predictor. Dissert. Abstr.

N78-16913# Michigan Univ., Ann Arbor. Inst. for Social Research.
COMPARATIVE ISSUES AND METHODS IN ORGANIZATIONAL DIAGNOSIS
David G. Bowers, Alan S. Davenport, and Gloria E. Wheeler Nov. 1977 93 p refs
(Contract N00014-77-C-0096)
(AD-A047292) Avail: NTIS HC A05/MF A01 CSCL 05/1

This report both introduces the topic of research on organizational diagnosis and discusses the methodological issues involved in it. It then describes the analyses to be reported in subsequent technical reports in the series. Four methods of diagnostic classification are to be examined using the Survey of Organizations data bank: distance function, multiple discriminant function, Bayesian, and decision tree. GRA

N78-16929# Transportation Research Board, Washington, D. C.
TRANSPORTATION SYSTEM MANAGEMENT
1977 171 p Conf. held at Minneapolis, 7-10 Nov. 1976 Sponsored in part by UMTA, Wash. D. C., FHA, Wash. D.C. and Institute of Trans. Eng., Arlington, Va.
(PB-272846/7; TRB/SR-172) Avail: NTIS HC A08/MF A01 CSCL 13B

The following topics are discussed: Traffic operations improvements to manage and control the flow of vehicles; Preferential treatment for transit and other high occupancy vehicles; Management and control of parking; Actions to reduce vehicle use; Actions to improve transit management efficiency; Transportation system management from the Federal Highway Administration perspective; State Highway Department view of TSM; Management by objectives applied to transportation system management; Packaging transportation elements to meet energy goals; Packaging transportation elements to meet environmental objectives. GRA

N78-17729# California Univ., Berkeley. Electronics Research Lab.
AUTOMATED EVALUATION SYSTEMS Final Report, 15 Nov. 1974 - 14 Sep. 1977
C. V. Ramamoorthy 14 Sep. 1977 24 p refs
(Contract N00014-75-C-0485)
(AD-A047653) Avail: NTIS MF A01 CSCL 09/2

The overall objective of the research has been to investigate software development process, automated testing tools, and development techniques for improving reliability of large-scale software systems. In order to accomplish this objective, a preliminary survey on reliability and integrity of large computer programs has been conducted and a scheme has been proposed as a reasonable approach to developing reliable large-scale software. Author (GRA)

N78-17914 Iowa State Univ. of Science and Technology, Ames.
WORK-IN-PROCESS INVENTORY AND PRODUCTION CAPACITY Ph.D. Thesis
Sung Ho Chung 1977 173 p
Avail: Univ. Microfilms Order No. 77-25977

In deterministic production system, which is one of the two hypothesized systems, the first objective is to derive a functional relationship between the Work-In-Process inventory and the parameters of the system. The second objective is to find an optimum solution. The deterministic production system is used as a vehicle to combine the decision on inventory, that on production scheduling and that on production capacity. In stochastic production system, which is the other of the two hypothesized systems, the first objective is to derive an empirical functional relationship between the production lead time of each part and the level of congestion in the production floor of the system. The second objective is to find the optimum level of congestion which minimizes the total cost which includes inventory holding cost and the cost associated with lowering the level of congestion. Dissert. Abstr.

N78-17915*# Gellman Research Associates, Inc., Jenkintown, Pa.
THE ROLE OF ENGINEERING IN THE FLIGHT EQUIPMENT PURCHASING PROCESS Final Report
Dec. 1977 85 p
(Contract NASw-3075)
(NASA-CR-156839) Avail: NTIS HC A05/MF A01 CSCL 05A

The role of the airline engineering department in the flight equipment acquisition process is examined. The data for the study was collected from six airlines. The principal findings of the study include: (1) engineering activities permeate, but do not dominate the airline flight equipment decision process. (2) The principal criterion for the flight equipment acquisition decision is return on investment. (3) The principal sources of information for the airline engineering departments in the monitoring process are the manufacturers of equipment. Subsidiary information sources include NASA publications and conferences, among others and (4) The engineering department is the principal communication channel for technical information. Author

N78-17916# Perceptronics, Inc., Woodland Hills, Calif.
AN INTERACTIVE COMPUTER AIDING SYSTEM FOR GROUP DECISION MAKING
Steven Johnston, Steven Levin, Judea Pearl, Marcy Agmon, and Antonio Leal Dec. 1977 87 p refs
(Contract MDA903-77-C-0184)
(AD-A047706; PQTR-1046-77-12) Avail: NTIS HC A05/MF A01 CSCL 05/8

This report describes a program centered on the demonstration of an interactive computer aid for group decision making. The report includes: (1) descriptions and theoretical bases for the system's principal decision analysis algorithms, (2) a report on the system software structure and major components, (3) scenario materials for evaluation studies, and (4) a comparison of the group aiding system to the SRI Decision Aiding Program. The next phase of the program will concentrate on operational testing and comparison of individual and group trees. Author (GRA)

N78-17919# RAND Corp., Santa Monica, Calif.
A DYNAMIC MODEL FOR OPTIMUM BONUS MANAGEMENT: COMPUTER PROGRAM AND MATHEMATICAL ANALYSIS Interim Report
Ray Danchick Oct. 1977 67 p
(Contract DAHC15-73-C-0181; ARPA Order 189)

(AD-A047983; RAND/R-1940/1-ARPA) Avail: NTIS HC A04/MF A01 CSCL 05/9

This report describes the mathematics and the computer program for solving the problem of optimum bonus management formulated in 'A Dynamic Model for Optimum Bonus Management'. The problem of optimum bonus management is treated as a discrete linear control system with a quadratic cost function and solved by using Pontryagin's discrete maximum principle. The state of the system at discrete time is a vector of numbers of men in each of a set of year groups. The system evolves linearly in time under linear controls that are the bonuses paid to the men in a prescribed subset of the year groups. The program solves for the sequence of bonus values that drive a given initial state of year groups to a prescribed final state and minimizes a sum of quadratic bonus and penalty costs. The program, which consists of a main program and 22 subroutines, is written in FORTRAN IV double precision for the IBM 370-158. GRA

N78-17948# Godschalk (David R.), Chapel Hill, N. C.
CARRYING CAPACITY APPLICATIONS IN GROWTH MANAGEMENT: A RECONNAISSANCE Final Report
David R. Godschalk and Norman Axler Jul. 1977 180 p refs (Contract HUD-829-77)
(PB-273494/5; HUD/RES-1166) Avail: NTIS HC A09/MF A01 CSCL 13B

A review of 28 recent plans and studies is given using the concept of carrying capacity in growth management at the state, regional, or local level. A relevant application is defined as one that looks at effects of urban development upon the natural and man made environments in terms of system effects, and one that recognizes the possibility for governmental action to effect system capacity in terms of thresholds of development. Carrying capacity is viewed as a way of framing relationship between growth, environmental quality, public policy, and investment in infrastructure. The discussion investigates background and evolution of carrying capacity, compares methods and content of current applications, presents conclusions on the state of the art, and makes recommendations for further development of carrying capacity planning. Also given are a bibliography of carrying capacity reports and a summary of a 1977 workshop held to discuss the report findings. GRA

N78-18441# Abex Corp., Oxnard, Calif.
RELIABILITY, IMPROVEMENT WARRANTY (RIW) MID CONTRACT EVALUATION Report, Apr. 1973 - Aug. 1977
Oscar Markowitz 15 Oct. 1977 138 p refs
(Contract N00383-73-C-3318)
(AD-A048244; ASO-TEE-2-77) Avail: NTIS HC A07/MF A01 CSCL 15/5

RIW (Reliability Improvement Warranty) is considered by DOD (Department of Defense) as being in a trial phase during which the philosophies, techniques and applications could be wrung out. The Abex RIW contract, about which this report deals, innovated features of no exclusions, support, as well as early timing in the sequence of the life of an item. Thus, the report on this Abex RIW contract is meaningful in terms of evaluating RIW results against other most likely results should an otherwise normal support mode have been selected rather than RIW. The pre-contract history is provided as well as the main conditions and terms of the RIW contract itself. Each area of interest (Program, Administration, Engineering, Logistics and Economics) is reviewed and quantified from data developed for the RIW contract purposes as well as data from other Navy sources obtained for evaluation purposes. Throughout the report, results obtained within the Abex contract are compared against non-RIW alternatives as well as other experiences obtained with other equivalent engine driven hydraulic pumps supported without benefits of RIW. Conclusions to date can be made that the RIW goals anticipated were more than met and the RIW contract has, in fact, resulted in a most cost effective support alternative available to the Navy. Additionally, the RIW alternative has provided superlative support to the fleet within a Navy investment considerably less than other comparative units used in other front line Navy aircraft. The report provides considerable supportative detail and analysis to back up the above conclusions. Author (GRA)

N78-18807# System Development Corp., Santa Monica, Calif.
SOFTWARE ACQUISITION MANAGEMENT GUIDEBOOK: VERIFICATION
Harvey Bratman and Marcia C. Finfer Aug. 1977 73 p refs (Contract F19628-76-C-0236)
(AD-A048577; SDC-TM-5772/002/02; ESD-TR-77-263) Avail: NTIS HC A04/MF A01 CSCL 09/2

This report is one of a series of Software Acquisition Management Guidebooks which provide information and guidance for ESD Program Office personnel who are charged with planning and managing the acquisition of command, control, and communications system software procured under Air Force 800 series regulations and related software acquisition management concepts. It provides a review of the software verification practices and procedures employed by industry and set forth in relevant DoD and Air Force regulations, specifications, and standards. It specifically: defines verification; describes the software related planning system engineering, and testing activities, carried out by the Program Office and the contractor, which lead to Computer Program Configuration Item (CPCI) verification; and references specific software techniques and tools required to CPCI verification. Author (GRA)

N78-18965# *Army Materiel Development And Readiness* Command, Alexandria, Va.
JOINT DESIGN-TO-COST GUIDE. LIFE CYCLE AS A DESIGN PARAMETER
15 Oct. 1977 81 p Supersedes DARCOM-P-700-6, NAVMAT-P5242 and AFLCP/AFSCP-1800-19
(AD-A048254; DARCOM-P-700-6; NAVMAT-P5242; AFLCP/AFSCP-1800-19) Avail: NTIS HC A05/MF A01 CSCL 05/1

The Design to Cost (DTC) concept establishes life cycle cost (life cycle cost to the maximum extent feasible) as a design parameter during a system's design and development phase and provides a cost discipline to be used throughout the acquisition of a system. This guide provides information and guidance for application of the Design to Cost concepts contained in DOD Directive 5000.28, Design to Cost, dated 23 May 1975 which has been included as Appendix A. The effectiveness of Design to Cost in meeting weapon systems needs within budget constraints greatly depends upon the manner in which it is implemented. This guide makes no attempt to develop a standardized approach to implement Design to Cost other than to outline certain policies and basic guidelines. Design to Cost must be tailored to fit the individual program based on stated objectives and risks involved. GRA

N78-18966# Decisions and Designs, Inc., McLean, Va.
SELECTING ANALYTIC APPROACHES FOR DECISION SITUATIONS. VOLUME 1: OVERVIEW OF THE METHODOLOGY Technical Report, 1974 - 1977
Rex V. Brown and Jacob W. Ulvila Sep. 1977 80 p refs Revised 3 Vol.
(Contract N00014-75-C-0426)
(AD-A047965; TR-77-7-25-Vol-1-Rev) Avail: NTIS HC A05/MF A01 CSCL 12/2

The three volumes of this report present a conceptual framework within which experienced decision analysts can derive generalizations that match analytic techniques to decision situations and communicate those generalizations to decision makers and inexperienced analysts. The framework consists of a three-way taxonomy: decision situations, analytic options, and performance measures. The first component is a 'situation taxonomy,' listing about one hundred dimensions of a situation that might be relevant to a particular analytic choice. These dimensions include: the stakes involved in a decision; the reaction time available; and the clarity with which options, probable consequences, and values are perceived. The second component is an analysis taxonomy, according to which about one hundred decision-analytic choices can be located in an analytic option space. Dimensions of the analytic taxonomy include: how much decision analysis is undertaken, how it is used, what type of model structure is involved, and what technique for probability assessment or consequence evaluation is employed. The third

component is a performance measure taxonomy, listing about thirty measures of effectiveness which can characterize the analytic options. The same taxonomy can also be used to describe a situation by expressing the relative importance of the performance measures in the situation. GRA

N78-18967# Decisions and Designs, Inc., McLean, Va.
SELECTING ANALYTIC APPROACHES FOR DECISION SITUATIONS. VOLUME 2: CASE STUDIES
Rex V. Brown and Jacob W. Ulvila Sep. 1977 115 p refs Revised 3 Vol.
(Contract N00014-75-C-0426)
(AD-A047880; TR-77-7-25-Vol-2-Rev) Avail: NTIS HC A06/MF A01 CSCL 12/2

The three volumes of this report present a conceptual framework within which experienced decision analysts can derive generalizations that match analytic techniques to decision situations and communicate those generalizations to decision makers and inexperienced analysts. This volume contains 5 case applications involving: (1) The problem of what foreign policy the U.S. should adopt in order to obtain more oil from a particular mideastern country; (2) A decision faced by the president of an electrical equipment company of whether to purchase the defense market rights to a flight safety patent; (3) A project undertaken by the Naval Electronics Systems Command to apply the /Design-to-Cost/ concept to an evaluation of proposed electronic warfare systems; (4) A Research and development project aimed at developing tactical decision aids for Navy task force commanders;. and (5) A study aimed at predicting NATO's response to actions taken by the Warsaw Pact countries. GRA

N78-18968# Decisions and Designs, Inc., McLean, Va.
SELECTING ANALYTIC APPROACHES FOR DECISION SITUATIONS. VOLUME 3: APPENDICES
Rex V. Brown and Jacob W. Ulvila Dec. 1977 86 p Revised 3 Vol.
(Contract N00014-75-C-0426)
(AD-A048228; TR-77-7-25-Vol-3-Rev) Avail: NTIS HC A05/MF A01 CSCL 12/2

The conceptual framework consists of a 3-way taxonomy: decision situations, analytic options, and performance measures. The first component is a 'situation taxonomy,' listing about 100 dimensions of a situation that might be relevant to a particular analytic choice. These dimensions include: the stakes involved in a decision; the reaction time available; and the clarity with which options, probable consequences, and values are perceived. The 2nd component is an 'analysis taxonomy,' according to which about 100 decision-analytic choices can be located in an analytic option space.' Included are: how much decision analysis is undertaken, how it is used, what type of model structure is involved, and what technique for probability assessment or consequence evaluation is employed. The 3rd component is a 'performance measure taxonomy,' listing about 30 measures of effectiveness which can characterize the analytic options. Performance measure dimensions include: enhanced logical reasoning, cost, speed, convenience, and facilitated communication. This component serves as a mediating factor, in matching analysis to situation. This volume contains very detailed lists of the 3 taxonomies and matching generalizations relating 22 analytic techniques to decision situations. GRA

N78-18970# Carnegie-Mellon Univ., Pittsburgh, Pa. Management Sciences Research Group.
AN EXPERIMENT ON EXECUTIVE DECISION MAKING
Eduard J. Fidler and Gerald L. Thompson Jul. 1977 37 p refs
(Contract N00014-75-C-0621)
(AD-A047888L; RR-407; WP-3-77-78) Avail: NTIS HC A03/MF A01 CSCL 05/3

This paper analyzes capital budgeting decisions of business executives in an experimental setting. Two different data analysis techniques, a linear programming and a maximum likelihood method, are used to analyze preference judgements for hypothetical investment projects. For each of the twenty investment projects the following information was provided: a probability distribution of returns on investment, and magnitude of the investment, the number of additional men to be hired for implementing the investment, and the expected payback period for the investment. Five conclusions are demonstrated based on two independent experiments with business executives: Mean return on investment, and payback period, are the most important investment characteristics; Upper and middle management executives have almost identical preference structures; Downside variation of the return distribution has a stronger influence on investment decisions than overall variations; Usefulness of this methodology for (1) analyzing preference judgments of individual executives; (2) training purposes; and (3) as an aid to organizational decision making; and Both data analysis techniques give highly similar conclusions. Author (GRA)

N78-18971# Naval Postgraduate School, Monterey, Calif.
TOTAL CONTRACTOR LOGISTICS SUPPORT: A NEW CONCEPT IN NAVAL AVIATION M.S. Thesis
Antonio Apap Dec. 1977 87 p refs
(AD-A048674) Avail: NTIS HC A05/MF A01 CSCL 15/5

This thesis investigates a new concept in Naval Aviation: total contractor logistics support. The Federal Government's policy of relying on the private sector for goods and services, as promulgated in OMB Circular No. A-76, is examined in depth. The history and present experiences of the military services concerning contractor aviation logistics support are outlined and discussed. The Navy's T-44A program, including the acquisition, total logistics support contract, and the Navy's experience with this first 'turn key' operation of aircraft, is discussed in depth. Finally, the major advantages and disadvantages of total contractor support in Naval Aviation are explained and analyzed.
Author (GRA)

N78-18972# Stanford Univ., Calif. Dept. of Statistics.
MANAGEMENT STRATEGIES IN FIXED STRUCTURE MODELS OF COMPLEX ORGANIZATIONS, 2
Alan E. Gelfand and Crayton C. Walker 2 Sep. 1977 42 p refs
(Contract N00014-76-C-0475; Grant DAAG29-77-G-0031)
(AD-A048789; TR-250) Avail: NTIS HC A03/MF A01 CSCL 05/1

Part I of this effort suggests that switching net models provide useful insight into the behavior of complex organizational control systems. Equivalence relations on the responses of system elements were defined, namely internal homogeneity and forcibility. These in turn were interpreted as managerial strategies: management by exception and management by priority, respectively. The present article introduces a further equivalence relation--extended threshold, which is interpreted as management by consensus. The notion of extended threshold and its interaction with internal homogeneity and forcibility are examined in detail. We then observe that organization-wide control may be exercised by varying strategy levels. Finally, we speculate as to the psychological impact of the strategies on the work force and explore implications these interpretations have for organizational climate in complex enterprises. Author (GRA)

N78-18983# British Library Lending Div., Boston Spa (England).
DEVELOPING AN ACQUISITIONS SYSTEM FOR A UNIVERSITY LIBRARY
Anthony Hindle May 1977 52 p refs
(BLL-BLRDR-5351; ISBN-0-905984-03-X) Avail: British Library Lending Div., Boston Spa, Engl.: £3.00; or $6.00

A proposed acquisition system for the Lancaster University Library would divide intended acquisitions into research-related materials (R) or teaching-related materials (T) and the acquisitions budget would be split accordingly, with the R-budget allocated between departments and the T-budget retained centrally. Intended acquisitions would fall into one or the other category; those in the T-category being tested against criteria of expected use (and possbily returned to the requester for reconsideration). Topics covered included the coding of requests in terms of intended against actual use; the effect of price, loan category and recommendation on the amount of use of books; and in-library use compared with circulation. Inter-library lending as a substitute

for acquisition and the relationship between them are analyzed. The existing acquisition system at the library is analyzed. It is hoped that the results will help other universities to deal effectively with some of the problems of acquisition and collection size caused by reduced resources. Author

N78-18990# Public Technology, Inc., Washington, D. C. Information Systems Group.
HUD/PTI INFORMATION SYSTEMS IMPROVEMENT PROGRAM, CHIEF EXECUTIVE'S OVERVIEW Final Report
1977 80 p
(Contract HUD-H-2106R)
(PB-274207/0; HUD-RES-1187) Avail: NTIS HC A05/MF A01 CSCL 13B

An overview containing information which should help a jurisdiction decide whether or not to enter into an improvement program is presented. Relevant information systems concepts, program organization and operations, and the various factors involved when evaluating the costs and benefits of a formal improvement program were evaluated. GRA

N78-18994# Public Technology, Inc., Washington, D. C. Information Systems Group.
HUD/PTI INFORMATION SYSTEMS IMPROVEMENT PROGRAM. AN ORIENTATION TO COMPREHENSIVE INFORMATION SYSTEMS IMPROVEMENT FOR A LOCAL GOVERNMENT Final Report
1977 256 p refs
(Contract HUD-H-2106R)
(PB-274177/5; HUD-RES-1175) HC A12/MF A01 CSCL 13B

The series was developed as an aid to local administrators who want to improve their planning, management, and operations by improving their information, the system that produces it, the technologies used in processing it, and the effectiveness with which it is used. The Orientation and Training volume discusses the need for various types of orientation and training in relation to a comprehensive program to improve such systems, identifies different categories of recipients, discusses factors for condideration in estimating requirements, and presents a training methodology together with the forms that may be used in the training process. GRA

N78-18995# Public Technology, Inc., Washington, D. C. Information Systems Group.
HUD/PTI INFORMATION SYSTEMS IMPROVEMENT PROGRAM: TRANSFER ANALYSIS METHODOLOGY GUIDE Final Report
1977 79 p
(Contract HUD-H-2341)
(PB-274178/3; HUD-RES-1181) Avail: NTIS HC A05/MF A01 CSCL 13B

The guide is directed toward management level people in local government and is intended to help them plan and carry out the successful transfer of automated systems. The guide includes the organization and management of a transfer project, initial problem analysis, evaluation of the system to be transferred, assessing system and organizational differences, implementation, costs, and ingredients of successful transfer. GRA

N78-18996# Public Technology, Inc., Washington, D. C. Information Systems Group.
HUD/PTI INFORMATION SYSTEMS IMPROVEMENT PROGRAM. PLANNING AND MANAGEMENT: A METHODOLOGY GUIDE Final Report
1977 116 p
(Contract HUD-H-2106R)
(PB-274179/1; HUD-RES-1182) Avail: NTIS HC A06/MF A01 CSCL 13B

The establishment of an Information Systems Improvement Program in local government is discussed. A planning and management report with four interrelated sections is presented. A background briefing on relevant management and system building concepts, and discussions of program organization and operation were provided. Various factors involved when managing component projects within the program were also discussed. Author

N78-18997# Public Technology, Inc., Washington, D. C. Information Systems Group.
HUD/PTI INFORMATION SYSTEMS IMPROVEMENT PROGRAM: INFORMATION SYSTEMS ANALYSIS METHODOLOGY GUIDE Final Report
1977 162 p
(Contract HUD-H-2106R)
(PB-274180/9; HUD-RES-1183) Avail: NTIS HC A08/MF A01 CSCL 13B

A series dealing with the establishment of an information systems improvement program in local government is reported. The systems analysis methodology guide can be used by local government personnel to study a broad range of information-related problems in their jurisdiction. The techniques presented can be applied to small manual-system problems or to large computer-based information systems. The guide provides a background and perspective for an information systems analysis project, project management requirements, and information on the tasks involved when executing the analysis methodology. GRA

N78-19522# National Materials Advisory Board, Washington, D. C.
ECONOMIC AND MANAGEMENT ASPECTS OF NONDESTRUCTIVE TESTING, EVALUATION, AND INSPECTION IN AEROSPACE MANUFACTURING Final Report
1977 144 p refs
(Contract MDA903-74-C-0167)
(AD-A049339; NMAB-337) Avail: NTIS HC A07/MF A01 CSCL 14/2

This report reviews the roles of nondestructive testing, evaluation, and inspection as they influence the manufacturing and operational costs of aerospace systems. It is based on a study of various aspects of quality assurance, program management, process control, implementation of advanced technology, and specifications to identify factors that might influence costs. One major conclusion is that nondestructive testing (NDT) represents a small percentage of the overall costs of an aerospace system and that improvements in NDT evaluation procedures, through use of available technology, could lower costs of manufacture and reduce operational and maintenance costs. Several steps are recommended for reducing costs of NDT and increasing the overall effectiveness of the money that is spent to guarantee the reliability of aerospace systems. These recommendations include the establishment of a Department of Defense (DoD) Executive Committee on NDT to act as a steering body to guide and direct activities that will make more effective use of available technology and procedures. Other recommendations and suggestions relate to program management, the potential use of current technology, and procurement specifications. Author (GRA)

N78-19551# Babcock and Wilcox Co., Akron, Ohio. Nuclear Equipment Div.
STRESSES FROM PRESSURE, RADIAL, AND MOMENT LOADS IN CYLINDER-TO-CYLINDER VESSEL BY A FINITE PLATE METHOD
S. J. Brown and M. E. Fox Aug. 1977 23 p refs Presented at the 4th Intern. Conf. on Structural Mech. in Reactor Tech., San Francisco, 15 Aug. 1977
(Contract EY-76-C-15-2395)
(CONF-770807-25) Avail: NTIS HC A02/MF A01

A simple technique, the finite plate method, is presented to analyze stresses in cylinder-to-cylinder junctures. The approach uses shallow shell formulations and a three term series expansion plate formulation, which limits the range of applicability. The value of the method is its accuracy, economy, and ease in modeling a structure which falls within the range of applicability. Another appealing feature of the method is that its simplistic approach of superposition of results permits an easy extension to include additional loads not treated. For those mechanical loadings not developed, their effect can either be accounted for by the mechanisms discussed or by simple calculations. Generally, the stresses resulting from torsional or transverse shear are small

compared to the loads discussed, however, these shear effects may be included. ERA

N78-19552# California Univ., Livermore. Lawrence Livermore Lab.
COMPUTER SIMULATION OF THE CHARPY V-NOTCH TOUGHNESS TEST
D. M. Norris, Jr. 15 Aug. 1977 18 p Presented at the 4th Intern. Conf. on Structural Mech. in Reactor Technol., San Francisco, 15 Aug. 1977
(Contract W-7405-eng-48)
(UCRL-79762; Conf-770807) Avail: NTIS HC A02/MF A01

The calculational models (for A-533 Grade B class 1 steel) used both a rounded and a flat tipped striker. The notch stress/strain state was found to be independent of the three-point loading type and was most strongly correlated with notch opening displacement. The dynamic stress/strain state at the time of fracture initiation was obtained by comparing the calculated deformed shape with that obtained in interrupted Charpy V-notch tests where cracking had started. The calculation was also compared with stress/strain states calculated in other geometries at failure. The distribution and partition of specimen energy was calculated and adiabatic heating and strain rate are discussed. ERA

N78-20006*# National Aeronautics and Space Administration, Washington, D. C.
NASA'S UNIVERSITY PROGRAM: ACTIVE GRANTS AND RESEARCH CONTRACTS, FISCAL YEAR 1977
1977 328 p
(NASA-TM-79325) Avail: NTIS HC A15/MF A01 CSCL 05A

As basic policy NASA believes that colleges and universities should be encouraged to participate in the nation's space and aeronautics program to the maximum extent practicable. The Office of University Affairs (OUA) serves as a focal point for NASA's relationships with colleges and universities. One of its roles is to provide information on the NASA University Program. The present document is designed to serve several purposes and a wide range of audiences from private individuals to NASA employees. The emphasis is on the technical content of the program, rather than on fiscal data, which is available separately from OUA. As some terminology will not be familiar to all readers, a User's Guide is included to facilitate the fullest use of the material related to the interests of any particular reader. Author

N78-20007# Texas Univ., Austin. Center for Cybernetic Studies.
MEASURING THE EFFICIENCY OF DECISION MAKING UNITS WITH SOME NEW PRODUCTION FUNCTIONS AND ESTIMATION METHODS
A. Charnes, W. W. Cooper (Harvard Univ., Cambridge, Mass.), and E. Rhodes (Carnegie-Mellon Univ.) Aug. 1977 63 p refs
(Contracts N00014-75-C-0616; N00014-75-C-0569; N00014-76-C-0932; Grant NSF SOC-76-15876; NR Proj. 047-021)
(AD-A049149; CCS-308) Avail: NTIS HC A04/MF A01 CSCL 05/3

A series of linear programming models are used to clarify and extend a measure of efficiency. The duals to these models are shown to yield estimates of production coefficients from the same empirical data and computations that yield the measures of efficiency. The nature of the resulting production functions and ways in which they differ from more customary ones are discussed en route to synthesizing the associated cost functions and other such (economic) relations. Methods for adjusting observations are suggested for economic inferences and policy applications. Multiple output-multiple input extensions are effected via a new definition of efficiency which involves a nonlinear model for determining the optimal input and output weights from observational data. The theory of fractional programming is used to secure ordinary linear programming models from which the weights and efficiency measures may also be obtained. GRA

N78-20009# Decisions and Designs, Inc., McLean, Va.
HANDBOOK FOR DECISION ANALYSIS
Scott Barclay, Rex V. Brown, Clinton W. Kelly, III, Cameron R. Peterson, and Lawrence D. Phillips Sep. 1977 284 p refs
(Contract N00014-76-C-0074; ARPA Order 3052)
(AD-A049221; TR-77-6-30) Avail: NTIS HC A13/MF A01 CSCL 05/10

This handbook is intended to provide decision makers and their staffs (current or potential) with an introduction to the basic concepts and operations of decision analysis. Decision analysis is a quantitative method which permits the systematic evaluation of the costs or benefits accruing to courses of action that might be taken in a decision problem. It entails identification of the alternative choices involved, the assignment of values (costs/benefits) for possible outcomes, and the expression of the probability of those outcomes being realized. With this information at hand, one can then systematically combine the values and probabilities to show the probable gain or loss that is associated with alternative choices. GRA

N78-20010# Army Research and Technology Labs., Moffett Field, Calif.
ARMY AVIATION RDT AND E PLAN, SIXTH EDITION
Oct. 1977 372 p
(AD-A049214) Avail: NTIS HC A16/MF A01 CSCL 01/3

This Plan presents a time-phased analysis and presentation of the scientific and technological R/D efforts required to support the development of advanced airmobile systems responsive to the future needs of the Army. Plans and objectives are set forth for Army aviation research and development activities for FY78-97, with emphasis on the period from the present to 1982. Current R/D efforts in Army air mobility are directed primarily toward the development of a family of aircraft capable of vertical and short takeoffs and landings. These aircraft will fulfill identified requirements in the land combat functions of mobility, intelligence, firepower, combat service support, and command, control, and communications. The Airmobile Systems section of the Plan is aligned to present the operational systems, developing systems, and R/D planning concepts as an element of the land combat functions of mobility, intelligence, firepower, combat service support, and command, control and communication rather than as individual systems. The Technology sections present the research effort needed, assuming no constraints on resources, to develop the technology base necessary to support the airmobile system concepts. The Technology sections also provide a discussion of program planning and include the philosophy for the development of technical thrusts for the individual technologies. The Plan covers RDT/E activities (6.1 through 6.7 program categories) and also MM/T activities, which are normally part of Procurement of Equipment and Missiles-Army (PEMA). GRA

N78-20011# Army Research and Technology Labs., Moffett Field, Calif.
ARMY RESEARCH AND TECHNOLOGY LABORATORIES, FY 1977 Annual Report
1977 54 p
(AD-A049212) Avail: NTIS HC A04/MF A01 CSCL 01/3

The U.S. Army Research and Technology Laboratories (RTL) perform the air mobility R and D efforts of the U.S. Army Aviation Research and Development Command (AVRADCOM). The capabilities of their staff of research, engineering, and support personnel span the sciences, disciplines, and technologies of Army aviation. GRA

N78-20012# Army Research and Technology Labs., Moffett Field, Calif.
ARMY AVIATION RDT AND E PLAN. SIXTH EDITION. EXECUTIVE SUMMARY
Oct. 1977 23 p
(AD-A049213) Avail: NTIS HC A02/MF A01 CSCL 01/3
For abstract, see N78-20010.

N78-20791# Naval Postgraduate School, Monterey, Calif.
NTDS COMPUTER FACILITIES SCHEDULING SYSTEM Final Report
James K. Hartman and Gilbert T. Howard Dec. 1977 162 p

(AD-A050220; NPS55-77-45) Avail: NTIS HC A08/MF A01 CSCL 17/2

This report investigates the scheduling of Naval Tactical Data Systems (NTDS) mockups and the associated computer facilities at FCDSSA/FCDSTCP, San Diego. Provided is a design for an automated, computer based, interactive system for assisting in the management of job and equipment scheduling, equipment status recording, and equipment hookup. The decision logic of the scheduling portion of this system has been developed in detail, and a prototype scheduling program has been written and tested. The results indicate that the computer program can do a good job of producing a job schedule and the associated equipment assignments. A schedule for system implementation is also suggested. Author (GRA)

N78-20986 Case Western Reserve Univ., Cleveland, Ohio.
DYNAMICS OF SCIENTIFIC COMMUNICATION: AN APPLICATION TO SCIENCE FUNDING POLICY Ph.D. Thesis
Gilda Maria Braga 1977 118 p refs
Avail: Univ. Microfilms Order No. 77-30977

Some of the major problems associated with criteria for funding policies can be grouped into four categories, according to whether they refer to: (1) division of available funds among the different areas of science; (2) detection of oncoming crisis in a given area; (3) which scientists should be supported, within an area; and (4) which communication channels (journals) should be supported, also within an area. A model was devised, based on static and dynamic analyses of the literature. The results of the experiment show that the model is generalizable and can be used by science administrators as a help in establishing funding policies. Dissert. Abstr.

N78-20987 Northwestern Univ., Evanston, Ill.
DEVELOPMENT OF INFORMATION SYSTEMS ACTIVITIES AND INTERFACES TO SUPPORT TOP MANAGEMENT FUNCTIONS Ph.D. Thesis
Ronald J. Teichman 1977 449 p
Avail: Univ. Microfilms Order No. 77-32359

The general model of an advanced information system used as a point of departure is based on the current state of the art in information systems as applied in leading organizations. The research involved the applications of a system's design methodology to the identification and study of top management functions. Conceptual and empirical literature in the areas of business policy and organization theory was examined to specify and develop the advanced information system related requirements generated by these identified top management functions. By means of this study of the literature, the analysis began with an examination of the general environment within which top management must work and the nature of the issue resolution process which underlies all the decisional activities of top management. Dissert. Abstr.

N78-20988 Virginia Univ., Charlottesville.
A METHODOLOGY FOR MODELING A UNIVERSITY RESEARCH SUPPORT SERVICE SYSTEM Ph.D. Thesis
Seshagiri Rao Vemuri 1977 272 p
Avail: Univ. Microfilms Order No. 7800437

A framework was developed for examining a university research support service system by analyzing system performance in response to changes generated internally and/or externally to the system. The system effectiveness is measured in terms of net research time available to researchers, response time of research support services in providing services, and the contributions of these services to the indirect cost goal of the institution. The development of the basic model is carried out using the University of Virginia as an illustration. The analysis concerns system performance changes in response to procedural modifications in the institution, removal of external procedural constraints imposed by the government, and changes in organizational configuration. As an additional consideration, the simulation model is reinforced by relating its output to an independently developed overhead rate model. Dissert. Abstr.

N78-20989*# Operations Research, Inc., Silver Spring, Md.
ALTERNATIVE MANAGEMENT AND FUNDING OPTIONS FOR AERONAUTICS PROGRAMS, TASK 1
5 Mar. 1975 45 p refs
(Contract NAS5-24033)
(NASA-CR-156713) Avail: NTIS HC A03/MF A01 CSCL 05A

Research and technology will be at lower program levels with basic military research for aviation decreasing as fewer aircraft programs are initiated and the present new aircraft programs move into the prototype and production status. The key question is can industry take on the management and financing role and meet the criteria and characteristics considered essential for a viable research and technology program. The criteria for evaluating alternative approaches include an examination of the nature of the product to be provided, responsiveness to changing needs, efficiency in terms of costs, ability to provide leadership, and to provide impartial and independent evaluation of approaches, and to provide technological inputs for regulating functions. Author

N78-20990*# Operations Research, Inc., Silver Spring, Md.
IDENTIFICATION AND PROMULGATION OF OBJECTIVES FOR OAST R AND T PROGRAMS, TASK 2
5 Mar. 1975 41 p ref
(Contract NAS5-24033)
(NASA-CR-156714) Avail: NTIS HC A03/MF A01 CSCL 05A

Overall perspectives and guidelines are discussed for defining and promulgating NASA's Office of Aeronautics and Space Technology (OAST) objectives to meet national needs and goals in aeronautical, space, and nuclear technology. Emphasis is placed on the practicality of ultimately instituting objective-setting processes within the normal OAST operation, and of establishing quantitative measures to be used as a working management tool in determining the degree to which the objectives have been or are being met. Author

N78-20991# Canyon Research Group, Inc., Westlake Village, Calif.
NEW METHODOLOGIES PROGRAM Final Scientific Report, 1 Sep. 1975 - 31 Oct. 1977
Charles W. Simon 31 Oct. 1977 15 p refs
(Contract F44620-76-C-0008)
(AD-A049346; AFOSR-78-0008TR) Avail: NTIS HC A02/MF A01 CSCL 14/2

During this period, four reports were written and two reports written on earlier Advanced Methodologies Programs were revised. As a result of realizing the objectives of the program, it is now possible to study systematically the effects of 25, 50, or 100 variables deemed potentially critical to a particular task and to do so with considerable economy in the data collection effort while meeting all relevant scientific standards. No practical technique has ever been available before that would permit the experimenter to investigate problems of such complexity in such a systematic and economical manner. Author (GRA)

N78-20992# Naval Postgraduate School, Monterey, Calif.
A STUDY OF THE SYSTEM DEVELOPMENT PROCESS M.S. Thesis
Gabriel Oswaldo Flores Prado Dec. 1977 72 p refs
(AD-A050240) Avail: NTIS HC A04/MF A01 CSCL 05/2

Management information is of critical importance in modern decision making. The role of the computer in this process is rapidly expanding, creating challenging goals for data processing specialists and functional area specialists alike. A totally integrated computer based management information system (MIS) requires long term planning and design efforts coupled with detailed analysis of information system requirements. The MIS development generally follows a master plan; this master plan contains three major phases: MIS Analysis, MIS Design, and MIS Implementation. The different phases through which the master plan evolves are known as the system development process. This thesis describes the development of the master plan. Author (GRA)

N78-20993# Oak Ridge National Lab., Tenn.
DYNAMIC INTERACTIVE MANPOWER PLANNING AND ANALYSIS PROGRAM FOR A MATRIX ORGANIZATION
V. R. Bullington, R. G. Cardwell, and R. L. Stephenson Oct. 1977 26 p
(Contract W-7405-eng-26)
(ORNL-5276) Avail: NTIS HC A03/MF A01

A computerized manpower planning and analysis method used by a large complex research division with a matrix organization is explained. The example used is a research division consisting of 20 functional cost centers working on approximately 100 programs. The mathematical basis for the calculations and details of the computer program used in the system are described, and typical examples are displayed. ERA

N78-20994# General Accounting Office, Washington, D. C. Financial and General Management Studies Div.
NEED FOR ADDITIONAL INTERNAL AUDIT COVERAGE IN THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
27 Dec. 1977 23 p
(PB-275321/8; FGMSD-78-12) Avail: NTIS HC A02/MF A01 CSCL 05A

The NASA internal audit staff has been reduced by 50 percent since 1967, has been unable to adequately audit internal operations at Headquarters and several Field Centers and component installations. NASA's management needs to evaluate the audit function to determine what actions should be taken to strengthen the audit staff and provide effective audit coverage as required by the Accounting and Auditing Act of 1950. GRA

N78-21007# California Univ., Livermore. Lawrence Livermore Lab.
SCIENTIFIC DATA BASE MANAGEMENT AT LAWRENCE LIVERMORE LABORATORY: NEEDS AND A PROTOTYPE SYSTEM
Edward W. Birss, Stephen E. Jones, Daniel R. Ries, and Jeffry W. Yeh 3 Oct. 1977 14 p refs Presented at OECD/NEA Working Group on Nucl. Inform., Berkeley, Calif., 5-7 Oct. 1977
(Contract W-7405-eng-48)
(UCRL-80146; Conf-771062-1) Avail: NTIS HC A02/MF A01

A prototype scientific data base management system which uses a relational algebraic interactive use language is described. The software is comprised of a microprocessor, a parser, a parse tree generator, a parse tree interpreter, semantic routines, and data base access routines. ERA

N78-21018# Washington Univ., Seattle. Urban Transportation Program.
UTILIZING GEOGRAPHIC BASEFILES FOR TRANSPORTATION ANALYSIS: A NETWORK BASEFILE SYSTEM Research Report, Jul. 1976 - Jun. 1977
Claus D. Gehner Jun. 1977 46 p refs Sponsored by Urban Mass Transportation Admin.
(PB-275586/6; RR-77-3; UMTA-WA-11-0005-78-1) Avail: NTIS HC A03/MF A01 CSCL 13B

The existence of geographic base files (GBF) for most large urban areas offers a significant resource for the network models required for many transportation studies. The thrust of the Network Basefile System (NETBASIS) development, underway at the University of Washington since 1974, is to build upon the existing GBF data resource (which has been operational for the city of Seattle for many years) and to provide a general purpose transportation network data base together with the required data manipulation and display software. A status report on the NETBASIS development as of June 1977 is presented. GRA

N78-21808# Wright State Univ., Dayton, Ohio. Dept. of Administrative Science and Finance.
MULTI-ITEM SCHEDULING IN REPARABLE ITEM INVENTORY SYSTEMS WITH REFLECTION PROGRAMMING Interim Report
W. Steven Demmy Apr. 1977 39 p refs
(Grant AF-AFOSR-3011-76; AF Proj. 2304)
(AD-A049553; AFOSR-77-1293TR; WP-76-3011-4) Avail: NTIS HC A03/MF A01 CSCL 15/5

The repair and overhaul of military equipment is a costly and complex logistics activity. Factors that may have significant impact upon scheduling decisions in such systems include costs of set-up, production, and expediting, obsolescence probabilities, the availability of the reparable assets, manpower, equipment and funds required to support the repair effort. This paper reviews the current state-of-the-art for solving multi-item repair scheduling problems in such systems, and presents an algorithm for solving these problems using Generalized Upper Bounding with dynamic programming subproblems. Computational experience involving up to 170 items, 48 constraints, and 12 planning periods is also reported. Author (GRA)

N78-21970*# Ross (S.) and Co., Boston, Mass.
CONTINUED IMPLEMENTATION AND TESTING OF A NEIGHBORHOOD OFFICE CENTER (NOC) AND INTEGRATION OF THE NOC WITH AN ADMINISTRATIVE CORRESPONDENCE MANAGEMENT INFORMATION SYSTEM Final Report
16 Mar. 1978 85 p
(Contract NASw-3057)
(NASA-CR-156150) Avail: NTIS HC A05/MF A01 CSCL 05A

The concept of decentralized (remote) neighborhood offices, linked together through a self-sustaining communications network for exchanging voice messages, video images, and digital data was quantitatively evaluated. Hardware and procedures for the integrated multifunctional system were developed. The configuration of the neighborhood office center (NOC) is explained, its production statistics given, and an experiment for NOC network integration via satellite is described. The hardware selected for the integration NOC/management information system is discussed, and the NASA teleconferencing network is evaluated. A.R.H.

N78-21971# Florida Univ., Gainesville. Dept. of Industrial and Systems Engineering.
GROUP REPLACEMENT OF A MULTICOMPONENT SYSTEM WHICH IS SUBJECT TO DETERIORATION ONLY
B. D. Sivazlian and J. F. Mahoney Oct. 1977 37 p refs
(Grants DAHC04-75-G-0150; AF-AFOSR-2605-76)
(AD-A049502; RR-77-14; ARO-12640.20M) Avail: NTIS HC A03/MF A01 CSCL 15/5

The stationary characteristics of an n-component periodic review system which is subject to stochastic deterioration (but not to failure) are investigated. When the n-component vector which expresses the state of deterioration of the system pierces a certain surface the entire multicomponent system is replaced by items of identical cost structure at the time of the next review. In the absence of this situation nothing is replaced. It is assumed that there is a fixed cost associated with each replacement and that the operating cost of each item is a strictly increasing function of its state of deterioration. The conditions for minimizing the long-term cost of maintaining a system which operates under the stated policy were found through solution of a problem in variational calculus. Two examples are worked. A useful graph which aids in the solution of such problems is provided. Author (GRA)

N78-21972# Joint Conventional Ammunition Program Coordinating Group, Rock Island, Ill. Decision Models Directorate.
PERFORMANCE PREDICTORS FOR VALUE ENGINEERING PROGRAM MANAGEMENT Final Report
Daniel R. Turk Sep. 1977 40 p refs
(AD-A049696; JCAP-DM-T705) Avail: NTIS HC A03/MF A01 CSCL 14/1

This report presents the results of a study conducted by the Decision Models Directorate of the Joint Conventional Ammunition Program (JCAP-DM) during the 3d quarter FY77 for the purpose of developing predictive equations for management use in establishing annual quantitative performance goals for the Value Engineering (VE) Program of the US Army Armament Materiel Readiness Command (ARRCOM). The predictive

equations that were developed cover the three primary performance factors upon which the program is evaluated: (1) Dollar savings resulting from approved VE proposals. (2) Number of VE proposals submitted by contractors, and (3) Number of VE proposals submitted by in-house organizations. The report presents the study objectives, the methodology, the computation techniques using interactive programs, and the results. Input data and program output are provided. The method, which employs a combination of time-series analyses and step-wise regression techniques, indicated high correlation for this application. The forecast PEMA appropriation was always a dominant variable in predicting VE program performance. The method is applicable in situations where historical data is available and prediction equations are desired. Author (GRA)

N78-21973# Houston Univ., Tex.
MORPHOLOGY OF DESIGN OF AEROSPACE SYSTEMS WITH INCLUSION OF HUMAN FACTORS Final Scientific Report, 1 Oct. 1976 - 31 Aug. 1977
Benjamin Ostrofsky Aug. 1977 149 p refs
(Grant AF-AFOSR-3148-77)
(AD-A049999; AFOSR-78-0066TR) Avail: NTIS HC A07/MF A01 CSCL 05/1

This research report is intended to provide a basic clarification of the decision structure and methodology for the design of a high technology, large scale system with emphasis on integration of human factors and their associated metrics. The report summarizes and relates the design morphology to current USAF methodology for the management of system design, defines and classifies human factors which influence the decision structure of design, and clarifies the nature of subjective and objective requirements which are inputs to the decision structure. The conceptual framework developed as an effective approach to the solution of the problem of human factors inclusion into the design morphology is that of a three dimensional matrix representing the relationship among human factors, the design steps, and the current literature. This relationship allows for explicit human factors inclusion during the preliminary design phase of a new system and the resultant inclusion in the criteria function for the optimal design configuration. Author (GRA)

N78-21975# CACI, Inc., Arlington, Va.
EXECUTIVE AIDS FOR CRISIS MANAGEMENT Final Technical Report, 1 Dec. 1976 - 31 Aug. 1977
Leo A. Hazelwood, Janice Fain, Farid Abolfachi, John Hayes, John McIlroy, and Paul Davis 31 Aug. 1977 82 p refs
(Contract N00014-77-C-0135; ARPA Order 2928)
(AD-A049954; CAC361B) Avail: NTIS HC A05/MF A01 CSCL 05/1

This final technical report documents research on developing a prototype executive aid for crisis management. The report contains four chapters, four appendices, and a bibliography. Chapter 1 describes the effort in the context of ARPA's Crisis Management Program. Chapter 2 reviews the structure of the prototype executive aid, while Chapter 3 considers the role of data in the aid and the types of data required. Chapter 4 summarizes aid evaluation and transfer. The four appendices highlight various facets of the research, including the sample for which data have been collected, the types of data gathered, and the weighted objectives solution algorithm. Author (GRA)

N78-21976# General Accounting Office, Washington, D. C. Health Resources Div.
SUMMARIES OF CONCLUSIONS AND RECOMMENDATIONS ON THE OPERATIONS OF CIVIL DEPARTMENTS AND AGENCIES
26 Jan. 1978 400 p
(PB-276094/0; HRD-78-23) Avail: NTIS HC A17/MF A01 CSCL 05A

A follow-up report is given on a recommendation of the House Government Operations Committee and the Commission on Government Procurement that a continuing program of research be used to create better procurement practices and to design and test the best ways to carry out new policies. GRA

N78-21977# General Accounting Office, Washington, D. C. Logistics and Communications Div.
ECONOMIES AVAILABLE THROUGH IMPROVED INVENTORY MANAGEMENT
18 Jan. 1978 26 p
(PB-276048/6; LCD-78-212) Avail: NTIS HC A03/MF A01 CSCL 05A

Methods are given showing how General Service Administration can save millions of dollars annually through improved procedures and practices for procuring, managing, and supplying inventories. GRA

N78-21978# General Accounting Office, Washington, D. C. Procurement and Systems Acquisition Div.
FEDERAL AGENCIES SHOULD BE GIVEN MULTIYEAR CONTRACTING AUTHORITY FOR SUPPLIES AND SERVICES
10 Jan. 1978 33 p
(PB-276028/8; PSAD-78-54) Avail: NTIS HC A03/MF A01 CSCL 05A

Most Federal agencies operating with annual appropriations are prohibited from contracting for more than 1 year. The Commission on Government Procurement recommended that legislation be enacted to permit multiyear contracting by all agencies when judgement dictates that the Government will benefit. Legislation is now under consideration to accomplish this. GAO reassessed the advantages and disadvantages of multiyear procurement and found that it would be an advantageous procurement method. GAO recommends that the Congress enact legislation authorizing general multiyear contracting authority of Federal agencies and provide for the Office of Federal Procurement Policy to develop appropriate criteria to guide Federal agencies in its use. GRA

N78-21979# General Accounting Office, Washington, D. C. Procurement and Systems Acquisition Div.
A RANGE OF COST MEASURING RISK AND UNCERTAINTY IN MAJOR PROGRAMS: AN AID TO DECISION MAKING
2 Feb. 1978 33 p
(PB-276384/5; PSAD-78-12) Avail: NTIS HC A03/MF A01 CSCL 05A

In deciding whether to approve or fund a major program or weapon system, federal agencies and the Congress must assess: (1) need; (2) the most cost beneficial of several alternatives; and (3) what tradeoffs affecting other programs are necessary considering overall national priorities. Such assessments depend on expected program cost to a far greater extent than in the past. The single-point or specific-dollar estimate now used assumes a certainty as to cost that does not exist. The Government Accounting Office proposes the use of a range of cost, in addition to the point estimate. Presenting a range of cost should help decisionmakers assess the potential cost impact on the program if these uncertainties occur. GRA

N78-22779# Sacramento Air Logistics Center, McClellan AFB, Calif. Data Automation Branch.
SOFTWARE ENGINEERING PROJECT MANAGEMENT: A SURVEY CONCERNING U.S. AEROSPACE INDUSTRY MANAGEMENT OF SOFTWARE DEVELOPMENT PROJECTS Interim Report
Richard H. Thayer and John H. Lehman 1 Nov. 1977 18 p refs
(AD-A050802; SM-ALC/ACD-TR-77-02) Avail: NTIS HC A02/MF A01 CSCL 05/1

Project management is clearly a part of software engineering, and its effective employment plays a major role in reducing the problems associated with delivering software within estimated time and cost. The question this paper addresses is: 'What is the state-of-the-art in software engineering project management today'. In an attempt to provide this answer, a survey of highly qualified executive managers of major U.S. aerospace corporations was conducted. This paper reports on that survey describing how these corporations manage software development projects, discusses the major differences in methods used, and how software engineering project management might be improved.
Author (GRA)

N78-22780# Sacramento Air Logistics Center, McClellan AFB, Calif. Data Automation Branch.

SOFTWARE ENGINEERING PROJECT MANAGEMENT. A SURVEY ON THE U.S. AEROSPACE INDUSTRY'S MANAGEMENT: SOFTWARE DEVELOPMENT PROJECTS

Richard H. Thayer and John H. Lehman 1 Nov. 1977 30 p (AD-A050803; SM-ALC/ACD-TR-77-03) Avail: NTIS HC A03/MF A01 CSCL 05/1

This report contains a copy of the visual aids with accompanying narrative of a presentation given at the American Institute of Aeronautics and Astronautics (AIAA) Conference Computers in Aerospace, 31 Oct - 2 Nov 1977. This presentation was part of a session on 'Software Management - Development' and based on data gathered during a survey on how the U.S. aerospace industry manages its software engineering projects. This is Report No. 2 of a planned series of reports on the data. Report No. 1 is contained in the proceedings of the subject conference.

Author (GRA)

N78-22951# Texas A&M Univ., College Station. Inst. of Statistics.

A NEW STATISTICAL APPROACH TO PROJECT SCHEDULING

R. L. Sielken, Jr. and H. O. Hartley Dec. 1977 50 p refs (Contract N00014-68-A-0140; NR Proj. 047-700) (AD-A050846; THEMIS-TR-56) Avail: NTIS HC A03/MF A01 CSCL 14/1

This paper describes a comprehensive new procedure for determining a minimum cost project schedule when the activities making up the project have durations which are random variables. The cost of an activity is assumed to be a convex piecewise linear function of the activity's mean duration. The objective is to determine the activity mean durations which both minimize the total project cost and insure that the mean of the corresponding project completion time distribution is less than or equal to a specified project deadline. The entire distribution of the project's completion time under the minimum cost schedule is a valuable by-product. GRA

N78-22962# Defence Research Information Centre, Orpington (England).

PRODUCTION OF AN ABSTRACTS JOURNAL

George W. Hart *In* AGARD The Appl. of Inexpensive Minicomputers to Inform. Work Mar. 1978 17 p refs

Avail: NTIS HC A05/MF A01

Systems developed by information centers to produce an abstract journal with a minicomputer are described. Advantages the computer brings to the production of the abstract journal, including preparation of various types of indexes are emphasized. Other factors considered include form of input, processing procedures, and output equipment; contents and format of the journal; and source of software. J.M.S.

N78-22973# Massachusetts Inst. of Tech., Cambridge. Operations Research Center.

TRANSPORTATION PLANNING: NETWORK MODELS AND THEIR IMPLEMENTATION

Thomas L. Magnanti and Bruce L. Golden Jan. 1978 59 p refs (Contracts N00014-75-C-0556; DOT-TSC-1058; NR Proj. 347-027; MIT Proj. OSP-824911) (AD-A050652; TR-143) Avail: NTIS HC A04/MF A01 CSCL 12/2

Transportation planning plays an essential role in shaping regional and urban lifestyle. Complex decisions regarding policy alternatives for railroads, shipping, airline, and roadway traffic can often be, and often have been, analyzed using network optimization techniques. In this paper, we survey applications of network algorithms to transportation planning, stressing networks models and their efficient computer implementation. We discuss recent contributions concerning shortest paths, minimum cost network flows, traffic equilibrium, vehicle routing, and network design and we enumerate several open research problems. Much of our discussion reflects an emerging theme in the analysis of transportation problems, the blending of ideas from transportation science, computer science, and operations research.

Author (GRA)

N78-23594# Resource Planning Associates, Inc., Washington, D. C.

COMPREHENSIVE COMMUNITY PLANNING FOR ENERGY MANAGEMENT AND CONSERVATION: DEVELOPING AND APPLYING A COORDINATED APPROACH TO ENERGY-RELATED COMMUNITY DEVELOPMENT, VOLUME 1

14 Oct. 1977 140 p (Contracts EX-76-C-10-3879; E(49-1)-3879) (HCP/M3879-Vol-1; RA-77-0319) Avail: NTIS HC A07/MF A01

Physical and institutional characteristics that determine a community's levels and patterns of energy use were defined and methods of coordinating its energy systems established. The characteristic problems of rapid growth are described and their causes traced. A number of domestic and European community development approaches that might be applicable to managing rapid growth in the boomtown context are surveyed. ERA

N78-23595# Resource Planning Associates, Inc., Washington, D. C.

COMPREHENSIVE COMMUNITY PLANNING FOR ENERGY MANAGEMENT AND CONSERVATION: DEVELOPING AND APPLYING A COORDINATED APPROACH TO ENERGY-RELATED COMMUNITY DEVELOPMENT, VOLUME 2

14 Oct. 1977 336 p (Contracts EX-76-C-10-3879; E(49-1)-3879) (HCP/M3879-1-Vol-2; RA-77-0319) Avail: NTIS HC A15/MF A01

Analytical outputs that shaped the general approach and its adaptation to the selected target community (Mercer County, North Dakota) were produced. Methodologies of the development of analytical tools and investigation of community-development approaches and the selection of communities are given. ERA

N78-23596# Resource Planning Associates, Inc., Washington, D. C.

COMPREHENSIVE COMMUNITY PLANNING FOR ENERGY MANAGEMENT AND CONSERVATION: DEVELOPING AND APPLYING A COORDINATED APPROACH TO ENERGY-RELATED COMMUNITY DEVELOPMENT: EXECUTIVE SUMMARY

Dec. 1977 36 p (Contract E(49-1)-3879) (HCP/M3879-0003) Avail: NTIS HC A03/MF A01

This summary highlights and condenses the community development process and formulates an organizational approach to resolving the institutional and financial issues arising from energy related community development. ERA

N78-23981# Defense Systems Management School, Fort Belvoir, Va.

A PROPOSED MINI-MANAGEMENT INFORMATION SYSTEM FOR THE PROGRAM MANAGER FOR AVIONICS NAVAL AIR SYSTEMS COMMAND HEADQUARTERS

Benjamin F. Short Nov. 1977 43 p refs (AD-A052113) Avail: NTIS HC A03/MF A01 CSCL 05/2

The report describes selected functions within the Avionics Division of the Naval Air Systems Command Headquarters which could be incorporated into a computer base mini-Management Information System (MIS). The data and information upon which to base the report was derived from interviews, books and articles on MIS, and personal experience having been assigned to the Avionics Division. If a computer were to be made available to the Division to execute the MIS functions, the Division Director/Program Manager for Avionics would be better able to track the cost, schedule, and technical performance of the many assigned projects. Additionally, many administrative functions could more efficiently be performed if incorporated into the computer/MIS. With more complete information available, the Division director/PM could more efficiently manage the assigned projects. Author (GRA)

N78-23982# European Space Agency, Paris (France). Project Control Div.
PROJECT CONTROL REQUIREMENTS AND PROCEDURES FOR MEDIUM-SIZE CONTRACTS
Dec. 1977 52 p refs
(ESA-PSS-38-Issue-1) Avail: NTIS HC A04/MF A01

Project control requirements and procedures for medium-sized contracts are stipulated. These were evaluated from discussions held and agreements reached during a series of working-group meetings between ESA and Eurospace on project control, held during 1976 and 1977. These requirements take into account the experience gained with the project control methods applied to procurement actions in which the rate of expenditure ranged from 250,000 to 5,000,000 Accounting Units (AU) per year. Author (ESA)

N78-23983# European Space Agency, Paris (France). Project Control Div.
PROJECT CONTROL REQUIREMENTS AND PROCEDURES FOR SMALL CONTRACTS
Dec. 1977 36 p
(ESA-PSS-39-Issue-1) Avail: NTIS HC A03/MF A01

Project control requirements and procedures for small contracts are stipulated. These were evolved from discussions held and agreements reached during a series of working-group meetings between ESA and Eurospace on project control, held during 1976 and 1977. These requirements take into account the experience gained with project control methods applied to procurement actions in which the rate of expenditure ranged from about $50,000 to $250,000 per year. Author (ESA)

N78-24042# Defense Systems Management School, Fort Belvoir, Va.
THREE DEGREE INTERMEDIATE LEVEL MAINTENANCE OF NAVY AERONAUTICAL MATERIALS
Robert Edward Bates, Jr. 9 Nov. 1977 79 p refs
(AD-A052389) Avail: NTIS HC A05/MF A01 CSCL 01/5

This report discusses the development, implementation and impact of the concept of three degree maintenance relative to the traditional maintenance policy of three levels of maintenance for Navy aeronautical materials. An additional management tool specifically designed to supplement efforts directed towards improving the maintenance support posture of aeronautical materials at the intermediate level of maintenance results from the development of three degree maintenance concept. A formal methodology is provided to supplement management capability on an individual equipment/component basis to: (1) classify maintenance functions within levels and by activity; (2) assign maintenance responsibility to a specific level and activity; (3) assign maintenance tasks consistent with complexity, depth, scope, and range of work to be performed; and (4) ensure optimum use of limited resources. Author (GRA)

N78-24133# Institute for Defense Analyses, Arlington, Va. Cost Analysis Group.
ON SETTING AVIONIC SUBSYSTEM UNIT PRODUCTION COST GOALS Final Report
David C. Weimer Oct. 1977 79 p refs
(Contract DAHC15-73-C-0200)
(AD-A051337; AD-E500020; IDA/HQ-77-19573; P-1280) Avail: NTIS HC A05/MF A01 CSCL 14/1

Major avionics subsystems for candidate aircraft developed under the Design-to-Cost (DTC) acquisition concept were analyzed to gain additional insight into the critical production cost goal-setting process. The candidate aircraft sample consisted of the Air Force F-16 and A-10, the Navy F-18 and the Army Advanced Attack Helicopter. A total of 23 avionics subsystems assigned to the candidate aircraft were investigated. It was found that only six of the 23 subsystems met Department of Defense criteria for authentic DTC programs. The other subsystems were developed and acquired by airframe prime contractors on a competitive fixed-price basis with priced options for production. In these programs, competitive pricing replaced DTC goal-setting. Based upon limited research findings, it was concluded that subcontractor goal-setting was usually masked by competitive pricing practices; the resulting development programs did not have the schedule, cost, and design tradeoff flexibility to properly pursue the cost goal. It also was concluded that the goal establishment process, as observed for those 6 subsystems examined, was effective and did include appropriate important criteria for goal selection. GRA

N78-24212*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
THE DEEP SPACE NETWORK Progress Report, Jan. - Feb. 1978
15 Apr. 1978 319 p refs
(Contract NAS7-100)
(NASA-CR-157110; JPL-PR-42-44) Avail: NTIS HC A14/MF A01 CSCL 22D

Progress in flight project support, tracking and data acquisition (TDA) research and technology, network engineering, hardware and software implementation, and operations are reported.

N78-24244*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
AN EFFECTIVE PROCUREMENT AND FINANCIAL MANAGEMENT REPORTING SYSTEM
J. B. Rozek and F. R. Maiocco *In its* The Deep Space Network 15 Apr. 1978 p 289-310 ref

Avail: NTIS HC A14/MF A01 CSCL 05A

The existing computerized Goldstone procurement and financial (GPF) management data base system is described. Sample management analysis reports are included and discussed, along with estimated cost savings and anticipated benefits of the computerized system. In general, the system structure and procedures are relevant to any company's financial and procurement data acquisition and information handling system. Test data are used to demonstrate the capability of the GPF system of programs. Author

N78-24682# Booz-Allen and Hamilton, Inc., Bethesda, Md. Booz, Allen Applied Research Div.
PRELIMINARY DEPENDENCY ANALYSIS FOR PROGRAM EVALUATION
Mar. 1977 32 p
(Contract EX-76-C-01-2343)
(FE-2343-14-1) Avail: NTIS HC A03/MF A01

A generic dependency chart was developed as a framework for analysis of certain types of key planning problems. An early application of dependency network methodology to a specific problem, such as the planned atmospheric fluidized bed combustion demonstration plant project, was recommended. ERA

N78-24800# Essex Corp., Alexandria, Va.
HUMAN FACTORS ENGINEERING. PART 1: TEST PROCEDURES Final Report
James C. Perkins, George C. Maxey, Thomas B. Malone, Sheldon W. Shenk, and Mark Kirkpatrick, III 20 Dec. 1977 354 p refs
(Contract DAAD05-76-C-0787)
(AD-A051481; TECOM-TOP-1-2-610-Pt-1) Avail: NTIS HC A16/MF A01 CSCL 05/5

The material in this Test Operations Procedure (TOP) is intended to be used for the Human Factors Engineering (HFE) assessment of all types of materiel and systems tested by TECOM. Supplementary sources of guidance are indicated when required. It encompasses the HFE procedures for the testing of design, functional performance, and environmental considerations for the major test functions (operability, maintainability, transportability, portability/usability, erectability, and habitability) applicable to the HFE assessment. Part 1 of this TOP provides guidance on how to plan and conduct an HFE test. This part also includes specific test procedures and sample data collection forms, such as checklists, questionnaire/interview sheets and other data collection forms. Part 2, the Human Factors Engineering Data Guide for Evaluation (HEDGE) provides planning guidance concerning what to test and includes guidance in the selection of applicable test functions, test conditions, performance tasks, and detailed design criteria. GRA

N78-24801# Essex Corp., Alexandria, Va.
HUMAN FACTORS ENGINEERING. PART 2: HEDGE Final Report
James C. Perkins, George C. Maxey, Thomas B. Malone, Sheldon W. Shenk, and Mark Kirkpatrick, III 20 Dec. 1977 134 p
(Contract DAAD05-76-C-0787)
(AD-A051482; TECOM-TOP-1-2-610-Pt-2) Avail: NTIS HC A07/MF A01 CSCL 05/5

Partial contents: How to Use HEDGE (Human Factors Engineering Data Guide for Evaluation); Operability--Vehicles; Weapons; Materiel handlers; Electronics/Signals; Operational support; and Troop support equipment; Maintainability--Vehicles; Weapons; Materiel handlers; Electronics/Signals; and Operational Support; Transportability; Portability/Usability; Erectability; and Habitability. GRA

N78-24834# System Development Corp., Santa Monica, Calif.
SOFTWARE ACQUISITION MANAGEMENT GUIDEBOOK: REVIEWS AND AUDITS
George Neil Nov. 1977 82 p
(Contract F19628-76-C-0236)
(AD-A052567; SDC-TM-5772/006/02; ESD-TR-78-117) Avail: NTIS HC A05/MF A01 CSCL 09/2

This report is one of a series of Software Acquisition Management Guidebooks which provide information and guidance for ESD Program Office personnel who are charged with planning and managing the acquisition of command, control, and communications system software procured under Air Force 800 series regulations and related software acquisition management concepts. It combines existing guidance regarding reviews and audits currently contained in a number of different official documents into a single document and narrows the focus of existing guidance to those problems inherent in software acquisition management. Where appropriate, existing guidance is extended to include practices and procedures based on the practical experience of the author and others in acquiring software. The objective of this document is to instruct Air Force Program Office personnel in the effective use of reviews and audits as management tools in acquiring software. Author (GRA)

N78-24974*# Barry (Theodore) and Associates, Los Angeles, Calif.
SAMICS SUPPORT STUDY. VOLUME 1: COST ACCOUNT CATALOG Final Report
Sep. 1977 94 p refs Sponsored in part by ERDA Prepared for JPL
(Contracts NAS7-100; JPL-954800)
(NASA-CR-157131; ERDA/JPL-954800-77/2.1) Avail: NTIS HC A04/MF A01 CSCL 05A

The Jet Propulsion Laboratory (JPL) is examining the feasibility of a new industry to produce photovoltaic solar energy collectors similar to those used on spacecraft. To do this, a standardized costing procedure was developed. The Solar Array Manufacturing Industry Costing Standards (SAMICS) support study supplies the following information: (1) SAMICS critique; (2) Standard data base--cost account structure, expense item costs, inflation rates, indirect requirements relationsips, and standard financial parameter values; (3) Facilities capital cost estimating relationships; (4) Conceptual plant designs; (5) Construction lead times; (6) Production start-up times; (7) Manufacturing price estimates.
Author

N78-24975# National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
SELECTION OF THE BEST FROM A SEQUENCE OF OPTIONS WITH IMPERFECT INFORMATION
T. J. Stewart Jul. 1977 21 p refs
(CSIR-SR-WISK-267; ISBN-0-7988-1159-5) Avail: NTIS HC A03/MF A01

A form of sequential decision problem is introduced in which options are presented in a sequence (as in the secretary problem) but in which the value of each option has to be inferred from experiments. Decisions have thus to be made concerning both the acceptance or rejection of each option and the degree of experimentation. General properties of the optimal policy are derived and a solution in a special case is obtained in principle. On the basis of these results, certain possible approximations to the optimal policy are suggested. Author

N78-24976# Arinc Research Corp., Santa Ana, Calif.
MISSILE-X PROGRAM LOGISTIC ELEMENT MANAGEMENT PLAN FOR SUPPORT FACILITIES LEM
A. N. Winter and A. J. Fremer 22 Aug. 1977 32 p
(Contract F04606-76-A-0087)
(AD-A052280; W77-1953-TN09) Avail: NTIS HC A03/MF A01 CSCL 15/5

This Support Facilities Logistic Element Management Plan is one of twelve plans supplementing the guidance and direction for the Integrated Logistic Support (ILS) program as delineated in the Missile-X Integrated Logistic Support Plan (ILSP). Whereas the ILSP provides general guidance and direction for integrating all logistic elements into the overall program requirements, this plan treats the specific actions, milestones, and coordination efforts of the Logistic Element Manager for Support Facilities (SF-LEM). It has been written to assist the SF-LEM in fulfilling his responsibilities toward achieving the ILS objectives of the MX Program. GRA

N78-24977# Arinc Research Corp., Santa Ana, Calif.
MISSILE-X PROGRAM LOGISTIC ELEMENT MANAGEMENT PLAN FOR RELIABILITY INTERFACE LEM
A. N. Winter and A. J. Fremer 15 Aug. 1977 33 p
(Contract F04606-76-A-0087)
(AD-A052250; W77-1953-TN04) Avail: NTIS HC A03/MF A01 CSCL 15/5

This Reliability Interface Logistic Element Management Plan is one of twelve plans supplementing the guidance and direction for the Integrated Logistic Support (ILS) program as delineated in the Missile-X Integrated Logistic Support Plan (ILSP). Whereas the ILSP provides general guidance and direction for integrating all logistic elements into the overall program requirements, this plan treats the specific actions, milestones, and coordination efforts of the Logistic Element Manager for the Reliability Interface. It has been written to assist him in fulfilling his responsibilities toward achieving the ILS objectives of the MX Program. GRA

N78-24978# Arinc Research Corp., Santa Ana, Calif.
MISSILE-X PROGRAM LOGISTIC ELEMENT MANAGEMENT PLAN FOR SUPPORT AND TEST EQUIPMENT LEM
A. N. Winter and A. J. Fremer 15 Aug. 1977 35 p
(Contract F04606-76-A-0087)
(AD-A052249; W77-1953-TN06) Avail: NTIS HC A03/MF A01 CSCL 15/5

This Support and Test Equipment Logistic Element Management Plan is one of twelve plans supplementing the guidance and direction for the Integrated Logistic Support (ILS) program as delineated in the Missile-X Integrated Logistic Support Plan Logistic elements into the overall program requirements. This plan treats the specific actions, milestones, and coordination efforts of the Logistic Element Manager for Support and Test Equipment (SE-LEM). It has been written to assist him in fulfilling his responsibilities toward achieving the ILS objectives of the MX Program. GRA

N78-24979# Arinc Research Corp., Santa Ana, Calif.
MISSILE-X PROGRAM LOGISTIC ELEMENT MANAGEMENT PLAN FOR MAINTENANCE PLANNING LEM
A. N. Winter and A. J. Fremer 22 Aug. 1977 35 p
(Contract F04606-76-A-0087)
(AD-A052279; W77-1953-TN12) Avail: NTIS HC A03/MF A01 CSCL 15/5

This Maintenance Planning Logistic Element Management Plan is one of twelve plans supplementing the guidance and direction for the Integrated Logistic Support (ILS) program as delineated in the Missile-X Integrated Logistic Support Plan (ILSP). Whereas the ILSP provides general guidance and direction for integrating all logistic elements into the overall program requirements, this plan treats the specific actions, milestones, and coordination efforts of the Logistic Element Manager for Maintenance Planning (MP-LEM). It has been written to assist the MP-LEM in fulfilling his responsibilities toward achieving the ILS objectives of the MX Program. The majority of information contained in Sections 1 through 4 herein is common to all plans. Sections 5 and 6 present information pertinent to the MP-LEM's efforts. Author (GRA)

N78-24980# Defense Systems Management School, Fort Belvoir, Va.

THE AFCMD SUBCONTRACT MANAGEMENT FUNCTION OR WHAT AN AFPRO SUBCONTRACT MANAGEMENT FUNCTION CAN DO FOR THE PROGRAM MANAGER

Roger S. Alexander Nov. 1977 45 p refs

(AD-A052390) Avail: NTIS HC A03/MF A01 CSCL 05/1

The purpose of the study project was to examine an approach to subcontract management being utilized by the Air Force Contract Management Division (AFCMD) from the perspective of what that approach could do for the buying agencies. The report initially reviews the events that led to the establishment of the subcontract Management (SM) function within AFCMD. It examines its organizations at Air Force Plant Representative Office (AFPRO) level and then explores the responsibilities of the SM function. The major responsibilities covered are the evaluation of the contractor's procurement system using the AFCMD Contractor Management System Evaluation Program (CMSEP) and tasks performed in direct support of buying agency. The report then reviews the future outlook and concludes with recommendations on how the buying agencies can take advantage of the SM services. Author (GRA)

N78-24981# Defense Systems Management School, Fort Belvoir, Va.

A NEW, INTEGRATED APPROACH TO ARMY OPERATIONAL TESTING AND EVALUATION

Freeman Gordon Lee 4 Nov. 1977 84 p refs

(AD-A052391) Avail: NTIS HC A05/MF A01 CSCL 05/1

An approach is developed to evaluate operational effectiveness and military utility for operational test and evaluation. The technique is applicable to many areas where the systems: engineering approach involves both quantitative and subjective elements. Operational test organizational interactions are given in Section 4. A model is developed in Section 5. Appendix B contains a technique to determine the operational effectiveness and military utility. Appendix C outlines the Delphi technique and Appendix D the application of utility theory to the problem of quantifying subjective information. Author (GRA)

N78-24982# Defense Systems Management School, Fort Belvoir, Va.

A STUDY OF USAF TEST AND EVALUATION POLICY

David Couter Kessler Nov. 1977 72 p refs

(AD-A052392) Avail: NTIS HC A04/MF A01 CSCL 05/1

The purpose of this report was to study the Air Staff effort and rationale used in revising the current AFR 80-14, Test and Evaluation, and AFR 23-36, Air Force Test and Evaluation Center, and to compare these regulations with the recent changes to DoD policy. GRA

N78-24983# Defense Systems Management School, Fort Belvoir, Va.

CONTRACTOR TESTING AND THE ARMY TEST AND EVALUATION MASER PLAN FOR FULL SCALE ENGINEERING DEVELOPMENT

Larry H. Johnson Nov. 1977 43 p refs

(AD-A052393) Avail: NTIS HC A03/MF A01 CSCL 05/1

Previous experience in the materiel acquisition process has shown that development of a master test plan for research and development poses many challenges. Because of general type guidance in RFP's and general type responses in contract proposals, a bilateral communications problem arises and the test program may or may not satisfy government requirements. Contractor testing plays a major role in the total test program and results of contractor tests must be utilized by government evaluators to satisfy independent government test objectives. If the contractor test program proves inadequate for government needs, the test program must be modified with minimum impact on cost and schedule. Herein lies the problem. The inherent problems related to developing a master plan through the RFP/proposal evaluation/contract initiation process are examined and recommendations for improving the process are offered. Author (GRA)

N78-24984# Defense Systems Management School, Fort Belvoir, Va.

RISK AVERSION VS. TECHNOLOGY IMPLEMENTATION

Michael H. Hersh Nov. 1977 31 p refs

(AD-A052386) Avail: NTIS HC A03/MF A01 CSCL 05/1

This report examines the key factors that inhibit the introduction of new technology into ongoing weapon systems. The effect of program manager (PM) risk aversion on this inhibition is evaluated. Factors causing PM risk aversion, including Department of Defense and Navy policies and procedures are considered. Results indicate major contributors to PM risk aversion include: risks taken that backfired, schedule pressure, program maturity, PM's relative loyalty to self, program, and service, inadequate methods of measuring risk and inability to hedge or insure risk. Forces that keep new technology out of ongoing programs include cost constraints, risk averse PMs, and on rare occasion, higher level authority. Author (GRA)

N78-24985# Defense Systems Management School, Fort Belvoir, Va.

AN OUTLOOK ON FUTURE WEAPON SYSTEMS ACQUISITION

J. Alan Higgins 1 Nov. 1977 65 p refs

(AD-A052385) Avail: NTIS HC A04/MF A01 CSCL 05/1

The subject of future weapons systems acquisition is discussed in this learning paper. Considerations for the threat, technology, economic trends and the competition for resources are included. Prospects for reducing acquisition costs are considered and alternatives for planning, programming and budgeting are discussed. The summary concludes that the outlook for future major weapon systems procurements is not favorable.

Author (GRA)

N78-24986# Defense Systems Management School, Fort Belvoir, Va.

FINANCIAL MANAGEMENT AS PRACTICED BY THE AIR FORCE HIGH ENERGY LASER PROGRAM

Jerome Thomas Janicke Nov. 1977 41 p

(AD-A052380) Avail: NTIS HC A03/MF A01 CSCL 05/1

This presentation discusses the budget execution in an Advanced Development program, the Air Force High Energy Laser Program. The discussion centers on three areas, the funds management of the total program allotment for a given fiscal year, establishment of the program funding structure, and the evolution of the internal funds management of this particular program. The first section addresses the difficulty associated with tracking the financing requirements for a most dynamic Advanced Development program. The unique profile of required funds versus available funds is shown. The discussion, then, centers on the management actions that provide the best technical achievement in a restricted funding environment. The funding structure section discusses the importance of financial interface between the program office and the finance and accounting system and the importance of one reporting system throughout the Department of Defense. The last section addresses the selling of funds management, to the technical management, the handling of internal budget reviews, the documentation of these reviews, and the payoffs. GRA

N78-24987# Defense Systems Management School, Fort Belvoir, Va.

MANAGEMENT INFORMATION SYSTEMS AND THE COMPUTER IN THE DEFENSE ACQUISITION PROGRAM OFFICE

Stuart N. Goodman Dec. 1977 38 p refs

(AD-A052375) Avail: NTIS HC A03/MF A01 CSCL 05/1

This report examines the role that computerized management information systems play in the decision making process in management organizations and in Department of Defense Program Offices for acquisitions in particular. A management information system is defined, and the need for information is discussed. The values and limitations of an MIS in the decision making process are presented. The MIS should not be considered as a decision making device, but only as an aid in helping management make the decisions. Before the MIS can be used to its maximum potential the manager must know what his specific information

needs are. Information on the implementation of an MIS, and several examples of possible applications in a program office are presented. Author (GRA)

N78-24988# Defense Systems Management School, Fort Belvoir, Va.

THE CONTRACTING OFFICER AND THE PROGRAM MANAGER: AUTHORITIES, RESPONSIBILITIES AND RELATIONSHIPS WITHIN THE NAVY WEAPON SYSTEM ACQUISITION MANAGEMENT ARENA

Robert Allen Forney Nov. 1977 33 p refs

(AD-A052377) Avail: NTIS HC A03/MF A01 CSCL 05/1

The purpose of this research effort has been to investigate the relationship which exists between the Contracting Officer and the Program Manager. The scope of the effort was necessarily restricted to an examination of that relationship as found at Naval Sea Systems Command Headquarters, Washington D.C. in order to make the effort more manageable. In order to achieve the stated goals, a brief examination of the authorities and responsibilities of the Procuring Contracting Officer (PCO) as set forth in the Armed Services Procurement Regulations was undertaken. This was followed by a brief review of the two major documents providing guidance and establishing the authorities and responsibilities of a Navy Program Manager, namely the Department of Defense Directive 5000.1 and Secretary of the Navy Instruction 5000.1. GRA

N78-24990# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.

AN EMPIRICAL STUDY OF THE IMPACT OF A PRODUCTION RATE CHANGE ON THE DIRECT LABOR REQUIREMENTS FOR AN AIRFRAME MANUFACTURING PROGRAM M.S. Thesis

Duane E. Congleton Sep. 1977 146 p refs

(AD-A052720; AFIT-LSSR-23-77B) Avail: NTIS HC A07/MF A01 CSCL 05/1

This study examined the impact on direct labor requirements resulting from externally caused production rate changes in the T-38/F-5 airframe production program. The basis for the study was the research conducted at the University of Oregon by Lieutenant Colonel Larry L. Smith in 1975-76. He used a modification to the standard learning curve model and devised a procedure to determine the forecasting ability of the model using data from the F-4, F-102, and KC-135 programs. Smith found that production rate, as expressed in his modified model, showed a significant inverse relationship to direct labor requirements. Additionally, his model provided substantially improved labor requirment forecasts as compared to corresponding forecasts provided by the standard learning curve model. In this study, which replicated Smith's research using T-38/F-5 data, Smith's findings and conclusions were validated. Based on the consistency of findings, Smith's model is recommended for use in forecasting direct labor requirements in active airframe production programs. Author (GRA)

N78-24998# Index Systems, Inc., Cambridge, Mass.

GUIDELINES FOR PREPARING AND REVIEWING FEASIBILITY STUDIES

Apr. 1977 149 p refs

(Contract EPA-68-01-3836)

(PB-274757) Avail: NTIS HC A07/MF A01 CSCL 05B

Considerations essential to making a sound decision on whether or not to use automatic data processing equipment for a specific project are discussed. The basic issues involved include: (1) the establishment of a clear, comprehensive and current definition of and justification for system requirements; (2) an analysis of several feasible alternative approaches such as manual, semi-automated, or fully-automated systems; and (3) a cost/benefit and cash/flow analysis of alternative methods. Procedures to be followed in performing the study are examined as well as the nine major tasks to be performed, and guidelines are given for reviewing and evaluating the feasibility study. A.R.H.

N78-24999# Defense Systems Management School, Fort Belvoir, Va.

LIFE COST MANAGEMENT, METHODOLOGY, AND CASE STUDIES

Andrew H. Berard Oct. 1977 64 p refs

(AD-A052388) Avail: NTIS HC A04/MF A01 CSCL 14/1

This study project examines the management policies that have initiated O and S cost control and the progress made on O and S costing methodology. Costing guidelines prepared by LMI are summarized to provide the reader with an overview of the guidelines content and a preview of CAIG O and S costing methodology guidelines. The RAND report on LCC analysis for aircraft turbine engines provides analysis methods that allows performance to be assessed with the present technology and determines cost and schedule risks. Further, commercial operational and maintenance practices are reviewed for military applicability. Three case studies representative of LCC management techniques are discussed in detail showing the impact of logistics alternatives, reliability by design, and maintainability features that contribute towards reduced O and S costs and lower LCC. The cases were selected from a LCC Seminar held on 29 Sept. 1977. The Army's Black Hawk program, Navy's F-18 program, and the Air Force's ARC-164 program are the three case studies selected. Important lessons learned on all three of the case studies should serve as models for other programs to follow that are concerned with LCC procurement. The results of the case studies provide positive indications that LCC management does work and can provide affordable systems. Author (GRA)

N78-25014# National Technical Information Service, Springfield, Va.

URBAN FINANCING AND TAXATION. A BIBLIOGRAPHY WITH ABSTRACTS Progress Report, 1964 - Mar. 1978

Edward J. Lehmann Mar. 1978 234 p Supersedes NTIS/PS-77/0204; NTIS/PS-76/0229; NTIS/PS-75/199

(NTIS/PS-78/0250; NTIS/PS-77/0204; NTIS/PS-76/0229; NTIS/PS-75/199) Copyright. Avail: NTIS HC $28.00/MF $28.00 CSCL 13B

Methods of financing and taxation for urban areas are discussed. The studies cover the planning, implementation, amount of revenues raised, and the effects of financing and taxation. A relatively large number of reports on property taxes are included. Author

N78-25015 National Technical Information Service, Springfield, Va.

FINANCING AND TAXATION FOR URBAN CONTROL OF POLLUTION. A BIBLIOGRAPHY WITH ABSTRACTS Progress Report, 1964 - Mar. 1978

Edward J. Lehmann Mar. 1978 202 p Supersedes NTIS/PS-77/0240; NTIS/PS-76/0228; NTIS/PS-75/202

(NTIS/PS-78/0273; NTIS/PS-77/0240; NTIS/PS-76/0228; NTIS/PS-75/202) Copyright. Avail: NTIS HC $28.00/MF $28.00 CSCL 13B

The citations relate to urban and regional planners who wish to study means of financing pollution abatement programs and of taxing sources as a means of pollution reduction. The reports are divided into three sections: air pollution studies, solid waste disposal studies, and water pollution and sewage treatment studies. Author

N78-25114*# IIT Research Inst., Chicago, Ill.

MANUFACTURING PROCESS APPLICATIONS TEAM (MATEAM) Quarterly Status Report, 1 Feb. - 30 Apr. 1978

Edmund R. Bangs 16 May 1978 31 p

(Contract NAS8-32229)

(NASA-CR-150725; QSR-1) Avail: NTIS HC A03/MF A01 CSCL 22A

Forty additional statements were added to the list of 150 problem/opportunity statements identifying possibilities for transfer of NASA technology to various manufacturing industries. Selected statements that are considered to have a high potential for transfer in the 1978 program year are presented in the form of goals and milestones. The transfer of a flux used in the stud welding of aluminum is reported. Candidate RTOP programs are identified. A.R.H.

N78-25269# National Technical Information Service, Springfield, Va.
CONSTRUCTION MANAGEMENT. A BIBLIOGRAPHY WITH ABSTRACTS Progress Report, 1964 - Mar. 1978
George W. Reimherr Apr. 1978 274 p Supersedes NTIS/PS-77/0291; NTIS/PS-76/0297; NTIS/PS-75/352 and COM-73-11798
(NTIS/PS-78/0319; NTIS/PS-77/0291; NTIS/PS-76/0297; NTIS/PS-75/352; COM-73-11798) Avail: NTIS HC $28.00/MF $28.00 CSCL 13B

The bibliography cites management studies on the physical, social, and environmental factors of the construction industry. Cost and design studies are included for military and civilian construction of buildings, houses, mobile homes, tunnel excavations, and roads. To aid the manger in planning and control, construction codes, data management, and contract administration research are also cited. GRA

N78-25270# National Technical Information Service, Springfield, Va.
METRICATION IN THE UNITED STATES. A BIBLIOGRAPHY WITH ABSTRACTS Progress Report, 1964 - Mar. 1978
Guy E. Habercom, Jr. Apr. 1978 167 p Supersedes NTIS/PS-77/0268; NTIS/PS-76/0305 and NTIS/PS-75/123
(NTIS/PS-78/0316; NTIS/PS-77/0268; NTIS/PS-76/0305; NTIS/PS-75/123) Avail: NTIS HC $28.00/MF $28.00 CSCL 14B

Materials are cited on the metric system of measurements and conversion of U. S. measurements to the metric system. The reports deal with the metrication process, industrial and economic impacts, problems involved, the benefits anticipated, and public reactions and relations. The metric system is dicussed, along with its application to various fields. GRA

N78-25435# Machinability Data Center, Cincinnati, Ohio.
THE MACHINABILITY DATA CENTER Annual Report, 1 Jan. - 31 Dec. 1977
John F. Kahles (Metcut Res. Assoc., Inc.) and John L. Krebs (Metcut Res. Assoc., Inc.) Mar. 1978 52 p refs
(Contract DSA900-77-C-3197)
(AD-A053027; AMMRC-TR-78-13; AR-13) Avail: NTIS HC A04/MF A01 CSCL 05/2

Machinability Data Center (MDC) operations during this reporting period resulted in the successful accomplishment of its contractual goals. Cost recovery income during the period was 72%, measured in actual dollars received for services provided. This center is one of a number of Information Analysis Centers sponsored by the Department of Defense. The specific functions of MDC include the collection, evaluation, storage, and dissemination of information pertaining to machining technology with emphasis on machinability data. The objectives of MDC's efforts are to decrease the cost of machining and to increase the productivity and reliability of machined products in behalf of the Department of Defense and other U.S. Government Agencies and their contractors. Because there is a continuing need for the universal application of evaluated machining data, MDC services are also made available to private industry. GRA

N78-25797# System Development Corp., Santa Monica, Calif.
SOFTWARE ACQUISITION MANAGEMENT GUIDEBOOK: SOFTWARE MAINTENANCE Contract Report, Jun. 1976 - Oct. 1976
J. R. Stanfield and Allan M. Skrukrud Oct. 1977 66 p refs
(Contract F19628-76-C-0236)
(AD-A053040; SDC-TM-5772/004/02; ESD-TR-77-327) Avail: NTIS HC A04/MF A01 CSCL 09/2

This report is one of a series of Software Acquisition Management (SAM) guidebooks which provide information and guidance for ESD Program Office personnel who are charged with planning and managing the acquisition of command, control, and communications system software procured under Air Force 800 series regulations and related software acquisition management concepts. The scope of this document is limited to those acquisition and development activities, occurring throughout the SAM cycle, which impact software maintenance. It includes discussions of system turnover to the using command and the transfer of program management responsibility to the supporting command. The computer program life cycle is also considered. Most of the information provided in this report covers the implementing command's responsibilities during the SAM cycle. However, software maintenance during the Deploymnet Phase is also discussed to provide the background for proper planning. Current programming concepts are discussed as well as the military regulations, specifications, and standards. Within these constraints, this report emphasizes what the Program Office can do to specify and procure maintainable software, including procurement of the facilities, support tools, and documentation necessary to support software maintenance activities.
Author (GRA)

N78-25804# National Technical Information Service, Springfield, Va.
COMPUTER SOFTWARE MAINTENANCE. A BIBLIOGRAPHY WITH ABSTRACTS Progress Report, 1970 - Mar. 1978
George W. Reimherr Apr. 1978 118 p Supersedes NTIS/PS-77/0259; NTIS/PS-76/0322; NTIS/PS-75/355
(NTIS/PS-78/0318; NTIS/PS-77/0259; NTIS/PS-76/0322; NTIS/PS-75/355) Copyright. Avail: NTIS HC $28.00/MF $28.00 CSCL 09B

This updated bibliography contains 113 abstracts. Topics covered include: problems of software maintenance, production, and design; resource allocation; benefit cost analysis; and management planning of computer software maintenance. Design of computer programs is considered for many applications. GRA

N78-25968# General Research Corp., Santa Barbara, Calif.
COST REPORTING ELEMENTS AND ACTIVITY COST TRADE-OFFS FOR DEFENSE SYSTEM SOFTWARE. VOLUME 2: EXECUTIVE SUMMARY Final Report, 11 Mar. 1976 - 11 Mar. 1977
C. A. Graver, W. M. Carriere, E. E. Balkovich, and R. Thibodeau May 1977 65 p refs 2 Vol.
(Contract F19628-76-C-0180)
(AD-A053021; CR-1-721-Vol-2; ESD-TR-77-262-Vol-2) Avail: NTIS HC A04/MF A01 CSCL 09/2

This technical report examines the costs of developing and maintaining computer software for major defense systems. A process model is described which depicts the relations among activities and phases of the software life cycle, identifies the product and cost information that is normally available, and specifies the milestones. This process model is normally used as the basis for selecting the elements of a software cost reporting system. The suggested reporting system also includes descriptions of the final product, time phasing of product development, a standardized list of Computer Program Components, and a standardized list of labor categories. During the study, data was collected from several sources including the following Air Force organizations: Electronic Systems Division, Aeronautical Systems Division, Space and Missile Systems Organization, and Data Systems Design Center. Cost estimating relationships for each phase of the software life cycle are explored, using the process model and the data. The importance of trade-offs in cost between phases is demonstrated. The report also contains estimating relationships for evaluating the cost effects of software size, computer capacity constraints, programming language, and changes in requirements. It also addresses the separation of two activities, error correction and product improvement, during the maintenance phase of the life cycle. Results are integrated with other software cost estimating techniques. Author (GRA)

N78-25969# University City Science Center, Philadelphia, Pa.
THE ROLE OF CONSORTIA IN THE NATIONAL R AND D EFFORT Final Report
Francis W. Wolek Jul. 1977 269 p refs
(Grants NSF PRA-74-02411)
(PB-277366; NSF/PRA-7402411/1/8) Avail: NTIS HC A12/MF A01 CSCL 05A

A study of one form of supporting industrial R&D in the United States: industrially sponsored consortia is presented. The report presents findings on the size of the R&D programs of

consortia, their location, their nature, and their value. These and other results were sought for the light they would shed on the policy of government toward consortia. GRA

N78-25971# General Research Corp., Santa Barbara, Calif.
COST REPORTING ELEMENTS AND ACTIVITY COST TRADEOFFS FOR DEFENSE SYSTEM SOFTWARE. VOLUME 1: STUDY RESULTS Final Report, 11 Mar. 1976 - 11 Mar. 1977
C. A. Graver, W. M. Carriere, E. E. Balkovich, and R. Thibodeau May 1977 299 p refs 2 Vol.
(Contract F19628-76-C-0180)
(AD-A053020; CR-1-721-Vol-1; ESD-TR-77-262-Vol-1) Avail: NTIS HC A13/MF A01 CSCL 09/2

In April 1976, General Research Corporation (GRC) began a study of 'Life-Cycle Costing of Major Defense System Software and Computer Resources,' Contract F19628- 76-C-0180. The purpose was to assist Air Force Program Offices and staff agencies in estimating, reporting and controlling the life-cycle costs of software. The study was performed under direction of the Electronic Systems Division (AFSC), Computer Systems Engineering Office (TOI). GRA

N78-25972# Air Force Materials Lab., Wright-Patterson AFB, Ohio.
AIR FORCE TECHNICAL OBJECTIVE DOCUMENT FISCAL YEAR 1979
Vincent Donlan Dec. 1977 31 p Supersedes AFML-TR-76-228, AD-A045303
(AD-A053340; AFML-TR-77-200; AF-A045303; AFML-TR-76-228) Avail: NTIS HC A03/MF A01 CSCL 15/3

This Technical Objective Document was prepared by the Air Force Materials Laboratory (AFML) and describes the Materials Technology Areas for meeting future Air Force operational needs. The six Technology Areas encompass the full spectrum of materials capabilities required for future aircraft, missile, space, and electronic systems - Thermal Protection Materials; Aerospace Structural Materials; Aerospace Propulsion Materials; Fluid, Lubricant, and Elastomeric Materials; Protective Coatings and Materials, and Electromagnetic Windows and Electronics. Presented for each TA is the general objective, specific goals, technical approaches, and a Laboratory TA focal point who can facilitate face-to-face discussions with Laboratory engineers and scientists. Author (GRA)

N78-25973# Massachusetts Inst. of Tech., Cambridge. Operations Research Center.
THE MULTI-PRODUCT PRODUCTION CYCLING PROBLEM: DEVELOPMENT OF HEURISTICS
Stephan C. Graves Mar. 1978 27 p refs
(Contract N00014-75-C-0556)
(AD-A053243; TR-16) Avail: NTIS HC A03/MF A01 CSCL 15/5

The multi-product production cycling problem is concerned with the determination of a production/inventory policy for a single capacitated production facility which is dedicated to producing a family of products. This paper studies this problem assuming stochastic demand. The one-product problem is formulated as a Markov decision problem which may be reasonably solved. For the multi-product problem, heuristic decision rules are proposed. In the context of an identical-product problem, we develop a heuristic decision policy which is based on the analysis of the one-product problem, and on two new notions: the composite product and the lead-time adjustment. This heuristic is then extended to the identical-cost problem, and the correlated demand problem. Arguments are presented for the generality of the identical-cost problem, and hence the generality of the proposed heuristic policy. Author (GRA)

N78-25974# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
A STUDY OF THE F-4 PROGRAM MANAGEMENT RESPONSIBILITY TRANSFER (PMRT) FROM THE AIR FORCE SYSTEMS COMMAND TO THE LOGISTICS COMMAND M.S. Thesis
Wesley K. Darrell Dec. 1977 155 p refs
(AD-A052903; AFIT/GSM/SM/77D-19) Avail: NTIS HC A08/MF A01 CSCL 01/3

The increasing costs of weapon systems have created a demand for more efficient program management. The Air Force organizational structure for acquiring and supporting weapon systems results in two commands sharing this responsibility. The Air Force Systems Command is responsible for research, development, procurement, and production. The Air Force Logistics Command is responsible for supply, maintenance, and other logistical support. Program management responsibility transfers from the Systems Command to the Logistics Command at some point in the acquisition cycle. This transition has, in the past, resulted in confusion, duplication, and fragmented responsibility. In an effort to provide for more efficient program management during program transition, the Program Management Responsibility Transfer concept was initiated in 1975. The F-4 program was the first program to transfer under this new concept. The purpose of this study is to provide a critical analysis of the new transfer process through a study of the F-4 transfer. GRA

N78-25977 National Technical Information Service, Springfield, Va.
LABOR RELATIONS, VOLUME 2. A BIBLIOGRAPHY WITH ABSTRACTS Progress Report, 1975 - Apr. 1978
Mary E. Young Apr. 1978 178 p Supersedes NTIS/PS-77/0281; NTIS/PS-76/0253; NTIS/PS-75/290
(NTIS/PS-78/0325; NTIS/PS-77/0281; NTIS/PS-76/0253; NTIS/PS-75/290) Copyright. Avail: NTIS HC $28.00/MF $28.00 CSCL 05I

Cited studies include labor problems, effects of labor unions, labor-management relationships, labor attitudes, attitudes of business towards labor, minority problems, and the cause and effect of labor migration and turnover on business and the economy. GRA

N78-25980# Bradford National Corp., Rockville, Md.
FINANCIAL INCENTIVES RESEARCH AND LENDING MARKET IMPACT ANALYSIS
Russell F. Smith, Patricia S. Bryant, Edward E. Cour, and Paul C. Kouchoukos Nov. 1977 92 p refs
(Contract EX-76-C-10-3866)
(HCP/M3866-1) Avail: NTIS HC A05/MF A01

The U.S. Energy Research and Development Administration is authorized by recent legislation to enter into loan guaranty and interest assistance agreements related to specific energy programs. These loan guaranty programs are designed to encourage the private sector to participate in the development of alternative energy sources and the conservation of energy. Two programs are currently authorized: one dealing with geothermal energy; the other dealing with electric and hybrid vehicles. An introductory overview provides a brief summary of: energy legislation, ERDA loan guaranty programs, basis of and purpose for the investigation, and scope. Subsequent sections of this report address related background information; methodology employed; data collection, and analysis of the information obtained; and specific recommendations based upon the results of the analysis. ERA

N78-26759 National Technical Information Service, Springfield, Va.
DATA BASE MANAGEMENT. CITATIONS FROM THE NTIS DATA BASE Progress Report, 1964 - Mar. 1978
George W. Reimherr Apr. 1978 213 p Supersedes NTIS/PS-77/0314; NTIS/PS-76/026S
(NTIS/PS-78/0328/1; NTIS/PS-77/0314; NTIS/PS-76/0365) Avail: NTIS HC $28.00/MF $28.00 CSCL 09B

The advent of on-line systems, and the increasing problems of file organization file maintenance, and file structures of data bases, has required the study and development of data base management systems. This bibliography of Federally-funded research cites the development of software packages and implementation of data base management systems into various information systems. Also cited are guidelines for use in optimizing and modeling data bases. (This updated bibliography contains

208 abstracts, 55 of which are new entries to the previous edition.) GRA

N78-26760 National Technical Information Service, Springfield, Va.
DATA BASE MANAGEMENT. CITATIONS FROM THE ENGINEERING INDEX DATA BASE Progress Report, 1970 - Mar. 1978
George W. Reimherr Apr. 1978 152 p Supersedes NTIS/PS-77/0315; NTIS/PS-76/0266
(NTIS/PS-78/0329/9; NTIS/PS-77-0315; NTIS/PS-77/0315; NTIS/PS-76/0266) Avail: NTIS HC $28.00/MF $28.00 CSCL 09B

The advent of on-line systems, and the increasing problems of file organization, file maintenance, and file structures of data bases, have resulted in the study and development of data base management systems. The bibliography of worldwide literature cites research on the development of software packages and the implementation of data base management systems into various information systems. Also cited are guidelines for use in optimizing and modelling the data bases. GRA

N78-26973*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
CRITICAL REVIEW OF AMES LIFE SCIENCE PARTICIPATION IN SPACELAB MISSION DEVELOPMENT TEST 3: THE SMD 3 MANAGEMENT STUDY
Robert Helmreich (Texas Univ., Austin), John Wilhelm (Texas Univ., Austin), Trieve A. Tanner, Joan E. Sieber (Calif. State Univ., Hayward), and Susan Burgenbauch Jun. 1978 84 p refs
(NASA-TM-78494; A-7471) Avail: NTIS HC A05/MF A01 CSCL 05A

A management study was conducted to specify activities and problems encountered during the development of procedures for documentation and crew training on experiments, as well as during the design, integration, and delivery of a life sciences experiment payload to Johnson Space Center for a 7 day simulation of a Spacelab mission. Conclusions and recommendations to project management for current and future Ames' life sciences projects are included. Broader issues relevant to the conduct of future scientific missions under the constraints imposed by the environment of space are also addressed. A.R.H.

N78-26974# Stanford Univ., Calif. Dept. of Operations Research.
CIRCULAR ONES AND CYCLIC STAFFING
John J. Bartholdi, III, James B. Orlin, and H. Donald Ratliff 20 Nov. 1977 27 p refs
(Contracts N00014-75-C-0493; N00014-76-C-0096)
(AD-A053202; SU-TR-31) Avail: NTIS HC A03/MF A01 CSCL 15/5

A large class of cyclic staffing problems, when formulated as (linear) integer programs, possess zero-one constraint matrices for which the ones in each row occur in consecutive components (the first and last components are considered consecutive). Included within this class is the problem of minimizing the linear cost of assigning workers to a multi-period cyclic schedule such that the demand in each period is satisfied, and each person works a shift of a common number of consecutive periods and is idle for the other periods (the first and last periods are considered consecutive). Any problem in this class may be transformed via a change of variables so that the resulting constraint matrix is, after deletion of a distinguished column, the transpose of a node-arc incidence matrix. The problem can then be solved in polynomial time parametrically in the distinguished variable as a sequence of network flow problems. Alternately, the optimal value of the distinguished variable can be found to within integer roundoff as its optimal value in the associated linear program with integer constraints ignored.
Author (GRA)

N78-26976# Office of the Director of Defense Research and Engineering, Washington, D. C.
COMMERCIAL BY DESIGN: PROCEEDINGS OF THE WORKSHOP ON COMMERCIAL COMMODITY ACQUISITION
1978 98 p Proc. held 17-19 Jan. 1978; sponsored in part by NBS
(AD-A052933) Avail: NTIS HC A05/MF A01 CSCL 05/1

These proceedings document the results of the Commercial Commodity Acquisition Program workshop entitled 'Commercial by Design'. The workshop addressed the following topics in buying commercial: User Needs, Market Research, Acquisition Strategy, Logistics Support, and Product Evaluation. Discussion and recommendations resulting from the workshop are provided.
Author (GRA)

N78-26977# Arinc Research Corp., Santa Ana, Calif.
MISSILE-X PROGRAM LOGISTIC ELEMENT MANAGEMENT PLAN NUCLEAR HARDNESS AND SURVIVABILITY INTERFACE LEM
A. N. Winter and A. J. Fremer 15 Aug. 1977 35 p refs
(Contract F04606-76-A-0087)
(AD-A052865; W77-1953-TN05) Avail: NTIS HC A03/MF A01 CSCL 05/1

This document is a Logistic Element Management Plan for the Nuclear Hardness and Survivability Interface element. It has been written to provide the NH and S-LEM with guidance in managing the NH and S Interface element and ensuring the integration of ILS NH and S requirements into the system design process. This plan, and those developed for the other eleven logistic elements, will become supplementary documents to the ILSP GRA

N78-26980# Denver Univ., Colo. Center for Social Research and Development.
AN ANALYSIS OF THE FEDERAL LABORATORY VALIDATION CONCEPT
Louis F. Cicchinelli and Lawrence Burton Oct. 1977 145 p refs
(Contract NSF C-860)
(PB-277976/7; R-77-01; NSF/RA-770419) Avail: NTIS HC A07/MF A01 CSCL 05A

The experiment was designed to investigate the effectiveness of providing performance validation for new technology from the public sector to overcome some of the barriers to an efficient innovation process by identifying and testing Federal incentives. The incentive tested in the Federal Laboratory Validation Experiment involved the opening of the Federal and accredited private laboratories for the purpose of validating new technological products or processes. Twelve sample technologies were selected for study and are included in the Appendix. GRA

N78-26981# General Accounting Office, Washington, D. C. Federal Personnel and Compensation Div.
FEDERAL EMPLOYEE PERFORMANCE RATING SYSTEMS NEED FUNDAMENTAL CHANGES Report to Congress
3 Mar. 1978 155 p
(PB-277983/2; FPCD-77-80) Avail: NTIS HC A08/MF A01 CSCL 05I

An amendment is proposed to chapter 43 of title 5, formerly the Performance Rating Act of 1950, to delete all statutory requirements for performance summary ratings of outstanding, satisfactory, or unsatisfactory for Federal employees. The Chairman and the heads of Federal agencies should improve the performance rating systems by making more use of the collaborative approach. That is, they should (1) establish systems built around employee participation; (2) develop present work requirements; and (3) review work achievements in the performance evaluation process. GRA

N78-26982# General Accounting Office, Washington, D. C. Program Analysis Div.
FEDERAL REGULATORY PROGRAMS AND ACTIVITIES
16 Mar. 1978 239 p
(PB-278489/0) Avail: NTIS HC A11/MF A01 CSCL 05A

An inventory of Federal regulatory programs and activities by agency and authorizing legislation is presented. Federal agencies with regulatory activity or program responsibilities were identified. Agencies were classified by substantive areas, such as power and energy, and natural resources and environment. Agencies were also classified by type of regulatory activity and degree of regulation. GRA

N78-26983# Northwestern Univ., Evanston, Ill.
IMPROVEMENT OF RESEARCH MANAGEMENT RELATIONSHIPS BETWEEN STATE GOVERNMENTS AND THE HIGHER EDUCATIONAL COMMUNITY Final Report
Charles H. Seibert, David Mintzer, and Arthur T. Schmehling 31 Aug. 1977 431 p refs
(Grant NSF NM-44247)
(PB-277991/6) Avail: NTIS HC A19/MF A01 CSCL 05A

Northwestern's RMI Program seeks suggestions for improvement of administrative relations with State agencies. As a constructive step, the RMI Program has distributed a Directory of individuals to contact within the higher education community to agencies. Task forces, with members from representative Illinois education institutions, were established. GRA

N78-26990# Westat Research, Inc., Rockville, Md. Research Div.
ORGANIZATIONAL FACTORS AFFECTING THE FLOW OF SCIENTIFIC AND TECHNICAL INFORMATION IN INDUSTRIAL R AND D DIVISIONS Final Report
Edwin F. Olson Jan. 1978 186 p refs
(Contract NSF-C-75-12800; Grant NSF SIS-75-12800)
(PB-277761/3) Avail: NTIS HC A09/MF A01 CSCL 05B

Based on an organizational diagnosis of the R&D divisions of three companies, this exploratory study found that the information-seeking behavior of scientists and engineers and their effectiveness in obtaining information are affected by the organization's work structures and processes, by the patterns of interpersonal interactions and organizational climate, and by the rewards and support they receive for taking risks to seek information. For example, the functional organization of an R&D unit can lead to barriers between the information specialists and those who need technical information services. In a company where the climate does not support information-sharing across project or department lines the informal information channels are under utilized. Individuals who perceive it as risky to ask for or provide technical information also believe their work groups are ineffective in getting the information they need. GRA

N78-26992# National Rural Center, Washington, D. C.
THE NATIONAL RURAL INFORMATION CLEARINGHOUSE: A REPORT ON ITS ESTABLISHMENT, ACTIVITIES AND ACHIEVEMENTS Draft Report, Mar. 1976 - Nov. 1977
1977 83 p
(Grant EDA-99-6-09521-1-2)
(PB-278027/8; EDA-78-053) Avail: NTIS HC A05/MF A01 CSCL 05B

The Clearinghouse is the information arm of the National Rural Center (NRC), a private, non-profit organization which was created to serve the people in rural America by engaging in research, special demonstration projects, outreach activities and information services. The mandate of the Clearinghouse is to get appropriate information to the right people at the right time; information about the full range of economic and human development programs that are needed in rural areas, communities, towns and countries. GRA

N78-27792# National Bureau of Standards, Washington, D. C. Systems and Software Div.
COMPUTER SCIENCE AND TECHNOLOGY: DATABASE ADMINISTRATION: CONCEPTS, TOOLS, EXPERIENCES, AND PROBLEMS
Belkis Leong-Hong and Beatrice Marron Mar. 1978 52 p
(PB-278664/8; NBS-SP-500-28; LC-78-606197) Avail: NTIS HC A04/MF A01 CSCL 09B

The concepts of database administration, the role of the database administrator (DBA), and computer software tools useful in database administration are described in order to assist database technologists and managers. A study of DBA's in the Federal Government is detailed in terms of the functions they perform, the software tools they use, the problems they have encountered, and advice they offer. Finally, some guidelines are presented on what database administration should do for management, and what management must do for their DBA's. GRA

N78-27975# Battelle Pacific Northwest Labs., Richland, Wash Battelle Human Affairs Research Centers.
MANAGEMENT OF SOCIAL AND ECONOMIC IMPACTS ASSOCIATED WITH THE CONSTRUCTION OF LARGE-SCALE PROJECTS: EXPERIENCES FROM THE WESTERN COAL DEVELOPMENT COMMUNITIES
Marjorie R. Greene and Martha G. Curry Jun. 1977 55 p refs
(Contract EY-76-C-06-1830)
(BNWL-RAP-16) Avail: NTIS HC A04/MF A01

An introductory analysis to some of the more complex issues raised by social and economic impact management, with experiences cited from Western coal-development communities is provided. Following an introduction, the paper is divided into sections corresponding to the major social and economic impacts experienced by rural communities surrounding an energy development. Each section contains a brief introductory description of the types of problems typically associated with the impact sector, and a discussion of management strategies either proposed or implemented for the impact. The management strategies are presented in tabular form, indicating the level of government responsible for implementation. Author

N78-27979# Wright State Univ., Dayton, Ohio. Dept. of Administrative Science and Finance.
ON THE BENEFIT-TO-COST RATIO OF BASE-LEVEL STOCKING DECISIONS FOR LOW DEMAND ITEMS Interim Report
W. Steven Demmy, Russell M. Genet, Thomas D. Meitzler, and Ross E. Miles Apr. 1978 22 p
(Grant AF-AFOSR-3011-76)
(AD-A053953; WP-76-3011-19) Avail: NTIS HC A02/MF A01 CSCL 15/5

This paper explores a fundamental cause of aircraft non-availability. It shows that for current Air Force aircraft, a significant portion of the lack of supply availability is due to not stocking items at the base level. Basic research on methods to alleviate this problem in a cost-effective way is reported. It is shown, with specific, real world examples, how these methods can be applied to current inventory aircraft. Author (GRA)

N78-27980# Decisions and Designs, Inc., McLean, Va.
DECISION THEORETIC AIDS FOR INFERENCE, EVALUATIONS, AND DECISION MAKING: A REVIEW OF RESEARCH AND EXPERIENCE
Gregory W. Fischer, Clinton W. Kelly, III, and Ward Edwards Feb. 1978 148 p refs
(Contracts N00014-76-C-0074; F33615-73-C-4056)
(AD-A053962; TR-78-1 30) Avail: NTIS HC A07/MF A01 CSCL 05/10

Over the past twenty years, there has been increasing emphasis on research concerned with human decision making abilities and with the development of formal methods to aid decision makers in reaching logically consistent choices. This broad area of research is of particular importance in national security contexts where key decision makers must resolve extremely complex decision problems characterized by uncertainty, conflicting information, and enormously high stakes. This technical report presents a summary of major portions of the literature bearing on people's ability to process information and to reach decisions. It also contains a review of laboratory and field assessments of judgmentally-based decision aiding systems embodying decision analytic concepts. GRA

N78-27995# Case Western Reserve Univ., Cleveland, Ohio. Dept. of Operations Research.
TO DEVELOP AND APPLY MANAGEMENT TECHNIQUES FOR USE IN THE IMPROVEMENT OF THE UNIVERSITY RESEARCH ADMINISTRATION FUNCTION Final Report
Burton V. Dean 14 Nov. 1977 28 p refs
(Contract NSF RMI-74-02639-A01)
(PB-279015/2; TM-432) Avail: NTIS HC A03/MF A01 CSCL 05B

Design and implementation of an improved research administration system is detailed and the organization and dissemination of these concepts to other universities is discussed. The project

was performed in four phases: (1) a detailed description of the total research administration system; (2) detailed problem analyses; (3) development of proposal for implementation; and (4) implementation and evaluation of results of the study. GRA

N78-28010# National Technical Information Service, Springfield, Va.
REGIONAL AND URBAN SOLID WASTE DISPOSAL PART 1: MANAGEMENT PLANNING. A BIBLIOGRAPHY WITH ABSTRACTS Progress Report, 1964 - Apr. 1978
Mona F. Smith Apr. 1978 231 p Supersedes NTIS/PS-77/0357; NTIS/PS-76/0301; NTIS/PS-75/184; NTIS/PS-74/105; NTIS-PK-151
(NTIS/PS-78/0403/2; NTIS/PS-77/0357; NTIS/PS-76/0301; NTIS/PS-75/184; NTIS/PS-74/105; NTIS-PK-151) Avail: NTIS HC $28.00/MF $28.00 CSCL 05B

Management, state, and local government policies, legislation, financing, data acquisition, and general planning studies for urban and regional solid waste disposal systems are cited. The topics covered public health, landfills, pollution, recycling, and load use. Studies on energy recovery and consumption, environmental impacts, land use, guidelines, and models are included. (This updated bibliography contains 226 abstracts, 29 of which are new entries to the previous edition.) GRA

N78-28016# Environmental Protection Agency, Washington, D. C. Office of Solid Waste Management Programs.
SOLID WASTE MANAGEMENT MANPOWER: PROFILE AND ANALYSIS
1978 63 p
(PB-279790/0; EPA-530/SW-161c) Avail: NTIS HC A04/MF A01 CSCL 05I

Management manpower involved in solid waste is considered. The analysis covers the manpower situation at the state level, the local operating level and in the area of resource recovery. The labor-management segment presents the reasons, results and solutions to problems between labor and management, and designs programs to produce incentive in workers. The impact of events on solid waste manpower examines cost pressures, enforcement of air pollution standards and financing of the system. Employment opportunities versus efficiency in management explores the situation of providing jobs while having to meet set environmental quality and efficiency standards. GRA

N78-28093# Institute for Defense Analyses, Arlington, Va. Cost Analysis Group.
THE FEASIBILITY OF ESTIMATING AVIONICS SUPPORT COSTS EARLY IN THE ACQUISITION CYCLE. VOLUME 2: APPENDIXES Final Report, 17 Jan. - Sept. 1977
John D. Morgan and Aaron B. Fuller Sep. 1977 251 p refs
(Contract DAHC15-73-C-0200)
(AD-A053486; AD-E500026; P-1292-Vol-2; IDA/HQ-77-19873) Avail: NTIS HC A12/MF A01 CSCL 15/5

This paper reports on research to determine the feasibility of developing methods to estimate, early in the system acquisition cycle, the potential support cost inputs of alternative avionics components envisioned for Air Force and Navy fighter aircraft. Support costs are defined as those costs incurred at the organizational, intermediate and depot levels to maintain avionics equipment and the costs of avionics spares and repair parts support. Volume 2 is a compilation of appendixes containing additional material to support the basic report, including summary evaluations of forty-eight key documents encountered in the literature search. GRA

N78-28650# Sandia Labs., Albuquerque, N. Mex.. Safety Engineering and Health Div. 3442.
SOLAR ENERGY RESEARCH AT SANDIA LABORATORIES AND ITS EFFECTS ON HEALTH AND SAFETY
Lawrence L. Young, III 1977 39 p refs Presented at Natl. Safety Congr., Chicago, 18 Oct. 1977
(Contract EY-76-C-04-0789)
(SAND-77-1412; Conf-771067-2) Avail: NTIS HC A03/MF A01

Various solar energy research and development projects at Sandia Laboratories are discussed with emphasis on the primary health and safety hazard associated with solar concentration systems. This limiting hazard is chorioretinal damage. The unique safety and health hazards associated with solar energy collector and receiver systems cannot be measured yet, but progress is being made rapidly. Research is continuing, especially for eye hazards, with more extensive work planned. ERA

N78-28822# Logistics Management Inst., Washington, D. C.
ADMINISTRATOR'S GUIDE: DATA BASE MAINTENANCE SYSTEM OF THE PIES
M. Shaw Oct. 1977 37 p
(Contract EM-77-C-01-8561)
(HCP/170070-02) Avail: NTIS HC A03/MF A01

The guide for the administrator of the data base maintenance system (DBMS) is given. Instructions are provided on how to use the data tracking update program (TRAKUP) and the data dictionary load program (DDLOAD). TRAKUP is used to update the PIES data values and the PIES data documentation. DDLOAD is used to generate the data dictionary that contains descriptive names for rows and columns of PIES data tables; beside loading the data dictionary from a card-image file, the program can print a report of the data dictionary. Also discussed are DBA procedures, instructions for completing the PIES data change request load, DMBS TSO procedures and JCL, and the DBMS file security system. Author (ERA)

N78-28979*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
PROJECT PLAN FOR JOINT FAA/NASA HEAD-UP DISPLAY CONCEPT EVALUATION
R. F. Haines Aug. 1978 16 p Sponsored in part by DOT
(NASA-TM-78512; HUD-1; A-7562) Avail: NTIS HC A02/MF A01 CSCL 05A

Head-Up Display (HUD) concept for large commercial turbojet transport aircraft is considered for the its contribution to aviation safety in the form of improved performance during the approach and landing phase flight. The basic reearch areas represent fundamental questions that are still unresolved and which were considered important to the effective use of the HUD by pilots. Project documentation and management responsibilities are outlined. G.G.

N78-28980# Air Force Logistics Command, Wright-Patterson AFB, Ohio. Directorate of Management Sciences.
LOGISTIC MANAGEMENT BY WEAPON SYSTEM
Jack H. Gambill and Ken Sinclair Apr. 1977 56 p refs
(AD-A053382; AFLC/XRS-76-11) Avail: NTIS HC A04/MF A01 CSCL 15/5

Headquarters Air Force requested the Air Force Logistics Command (AFLC) conduct a study to determine the feasibility of quantifying the resource impact of deleting particular weapon systems for the Air Force inventory. Therefore, the purpose of this study was: (1) review the extent of weapon system visibility within the existing AFLC requirements data systems, and (2) conceptualize a management information system that would quantify (in a timely manner) the impact on AFLC managed and/or controlled resources due to a significant change in the force composition or weapon/support system capability. The study concentrated on the five areas that displayed the greatest potential for weapon system forecasting: (1) Aircraft Modifications, (2) Aircraft Replenishment Spares and Repair Parts, (3) Aircraft Initial Spares and Repair Parts, (4) Depot Purchased Equipment Maintenance, and (5) Civilian Personnel. GRA

N78-28981# Air Force Logistics Command, Wright-Patterson AFB, Ohio.
LOGISTIC IMPACT OF LONGER C-5 MISSIONS
D. L. Casey May 1977 60 p refs
(AD-A053381; AFLC-TR-76-16) Avail: NTIS HC A04/MF A01 CSCL 01/3

This study was undertaken to determine the impact and savings to accrue from maximum commitment to longer C-5 missions (perhaps 15-17 hours) using inflight refueling. This was accomplished by reviewing maintenance writeup data for shorter flights versus longer flights. Traditional logistics forecasting techniques are based on the number of flying hours. Therefore, a change in sortie length would not be expected to impact on logistics requirements unless the overall number of flying hours changed. An examination of this relationship was undertaken in this study. It was found that the occurrence of a sortie tends to result in a given number of maintenance writeups regardless of the length of the sortie. Author (GRA)

N78-28982# Naval Research Lab., Washington, D. C. Radar Div.
A USER-ORIENTED MANAGEMENT PROGRAM FOR PROJECT MONITORING ON A TIME-SHARE COMPUTER TERMINAL Interim Report
Clifford L. Temes Jan. 1978 21 p
(ZF12151001)
(AD-A053386; AD-E000132; NRL-MR-3706) Avail: NTIS HC A02/MF A01 CSCL 05/1

This report describes a (FORTRAN) management computer program for monitoring technical progress and expenditures on a time-share terminal. The program is written for use on the DEC-10 computer at NRL. A basic feature of the output is a plot of actual past expenditures combined with estimated future expenditures, along with other project information such as technical milestones, major procurements and staffing.
Author (GRA)

N78-28983# Applied Science Associates, Inc., Valencia, Pa.
TSM GUIDE TO TRAINING DEVELOPMENT AND ACQUISITION FOR MAJOR SYSTEMS Final Report, May - Dec. 1977
Vernon L. Hanson and George R. Purifoy, Jr. Mar. 1978 100 p refs
(Contract DAHC19-77-C-0016; DA Proj. 2Q2-63731-A-770)
(AD-A053489; ASA-485; ARI-TR-78-A7) Avail: NTIS HC A05/MF A01 CSCL 15/5

New emphases are placed on the integration of subsystem developments into the materiel acquisition process for major Army systems. This guidebook describes and illustrates how training development and acquisition activities fit into the Life Cycle System Management Model (LCSMM) for total system development. Section 1 discusses the need for integrated subsystem development and identifies the main elements of the 'systems approach.' Section 2 presents a generalized training developments model, based on the ISD. Section 3 outlines the LCSMM. Major milestone events and activities are briefly described and discussed. Section 4 integrates training development activities with the total system acquisition process and sketches the role of the TRADOC System Manager (TSM) for the conduct and coordination of these activities. Author (GRA)

N78-28985# Florida Univ., Gainesville. Dept. of Industrial and Systems Engineering.
OPTIMAL CONTROL OF MULTI-SHOP SYSTEMS. PART 1: PARALLEL SHOPS. PART 2: SERIES SHOPS
Christopher Brooks Haas and Thom J. Hodgson Apr. 1978 60 p refs
(Contract N00014-76-C-0096)
(AD-A053599; RR-78-4-Pt-1; RR-78-4-Pt-2) Avail: NTIS HC A04/MF A01 CSCL 12/2

This paper considers the optimal control structure for multi-shop (Part I: Parallel, Part II: Series) systems, where the input to the shop system is random and the shop output is determined by the number of workers in the shop. The number of workers available to the system is held constant, while control is exercised in discrete time by adjusting the allocation of workers to the various shops in the system. There is a cost for transferring workers. Additionally, there is a cost of holding backlog in the system. The control objective is to minimize the sum of these costs over an infinite horizon. It is shown that for some regions of the system's state space the optimal control policies are known exactly without resorting to computational methods. For other regions it is shown that the problem can be decomposed into subproblems of reduced complexity. Finally, an inertia (hysteresis) property is established which reduces the number of policy combinations which must be considered in some cases, and completely eliminates the necessity to determine policy in other cases. The net result is a substantial reduction in the computer storage and computational effort required to solve for the optimal control policy. GRA

N78-29784# National Bureau of Standards, Washington, D. C. Inst. for Computer Sciences and Technology.
MANAGEMENT OF DATA ELEMENTS IN INFORMATION PROCESSING Final Report
Hazel E. McEwen, ed. Apr. 1978 155 p refs Proceedings of the 3rd Natl. Symp. held at NBS, Gaithersburg, Md., 28-30 Sep. 1977
(PB-279661/3; NBSIR-78-1446) Avail: NTIS HC A08/MF A01 CSCL 09B

Data element management in the field of health care, energy, paperwork management, trade data standards, and museum data is discussed. GRA

N78-29803# SRI International Corp., Menlo Park, Calif. Computer Science Lab.
HDM: COMMAND AND STAFF OVERVIEW
Lawrence Robinson Feb. 1978 64 p refs
(Contract N00123-76-C-0195; SRI Proj. 4828)
(AD-A054482; SRI-CSL-49) Avail: NTIS HC A04/MF A01 CSCL 09/2

HDM (the SRI Hierarchical Development Methodology) is an integrated set of concepts, procedures, languages, and on-line tools intended to assist in all stages of the software-development process. This document provides a description of HDM that is suitable for project managers or higher-level executives who are contemplating the use of HDM on software projects that they manage. Author (GRA)

N78-29968# Rutgers - The State Univ., New Brunswick, N. J.
INFORMATION SERVICE PLANNING AND EVALUATION: A GOAL PROGRAMMING APPROACH Ph.D. Thesis
T. J. McGeehan May 1978 167 p refs
(AD-A054108) Avail: NTIS HC A08/MF A01 CSCL 05/2

This paper discusses a generalized resource allocation and program planning model to aid information service managers optimize the value of an information program to their parent organization. The technique which is investigated is goal programming that incorporates both quantitative criteria and ordinal priorities into a common decision making system. It is a particularly powerful tool for dealing with a decision making environment in which there are conflicting goals and objectives. For the model which is described, thirty projects of a proposed operating program are evaluated in terms of fifty goal criteria representing six classes of organizational goals, including: (1) the range of available staff for information services, (2) the available budget, (3) the diversity of the overall program, (4) the capability of the information program to provide mandated functions, (5) concentration on basic services and products, and (6) concern over the agency's ability to keep pace with the demands for new and improved products and services. GRA

N78-29970# Control Data Corp., Arlington, Va. Engineering Management Operations.
INTERFACE MILESTONE MANAGEMENT (IM2) CONCEPT
Joseph C. Finnigan 1 Feb. 1978 54 p
(PB-279252/1; CDC-EMO-78-01) Avail: NTIS HC A04/MF A01 CSCL 05A

Interface events or milestones are the iterative interactions necessary between subsystem development managers that ensure the synergistic development of a total system by coordinating the progress of diverse technologies on a highly compressed time frame. PERT type networks provided the first meaningful framework for recognizing and resolving interface event problems on a scheduled basis. Interface Milestone Management (IM2) provides for the explicit communication of the responsibilities of two or more organizations in a project that must interact to achieve a given objective. IM2 can be added to any PERT,

CPM or precedence system. A listing of documents pertinent to management and technical interfaces is appended. GRA

N78-29971# Environmental Protection Agency, Washington, D. C. Office of Research and Development.
LABORATORIES NEEDED TO SUPPORT LONG-TERM EXPLORATORY RESEARCH IN THE US ENVIRONMENTAL PROTECTION AGENCY: A REPORT TO THE PRESIDENT AND THE CONGRESS, 31 MARCH 1978
Dennis Tirpak, ed. Apr. 1978 56 p refs
(PB-279607/6; EPA-600/8-78-003) Avail: NTIS HC A04/MF A01 CSCL 05A

Alternative laboratory approaches by which EPA could conduct long-term environmental research are examined. Areas treated include the formation of present EPA laboratories and the R&D process flow; (2) eleven research areas where enhanced long term support would be beneficial; (3) advantages and disadvantages of using individual grants and contracts, Federal Contract Research Centers, University or other private centers, and Federal Laboratories for conducting long-term research; and (4) the options for conducting long-term Exploratory activities within EPA. GRA

N78-29972# National Science Foundation, Washington, D. C. Task Force on Science Applications.
REPORT OF THE SCIENCE APPLICATIONS TASK FORCE TO THE DIRECTOR OF THE NATIONAL SCIENCE FOUNDATION
Jul. 1977 124 p refs
(PB-279458/4; NSF-77-78; NSF/RA-770441) Avail: NTIS HC A06/MF A01 CSCL 05A

Programs and issues discussed by the task force include: (1) research applications RANN programs; (2) engineering programs in NSF; (3) social and behavioral sciences; (4) applications programs in other parts of NSF; (5) relations between NSF and other federal agencies; (6) relations with state and local governments; (7) relations with industry; (8) relations with professional societies and public interest groups; and (9) educational matters related to applications programs. Recommendations were made concerning the desirability of strengthening the two types of science applications activities within NSF; changes in management policy in order to make the research applications programs more effective; and relations between NSF and the outside community. GRA

N78-29973# Stanford Univ., Calif. Dept. of Engineering-Economic Systems.
STRATEGIES FOR CONDUCTING TECHNOLOGY ASSESSMENTS Final Report
Joe E. Armstrong and Willis W. Harman Dec. 1977 156 p refs
(Grant NSF ERS-75-22788)
(PB-279471/7; NSF/RA-770439) Avail: NTIS HC A08/MF A01 CSCL 05A

An attempt is made to synthesize from a sample of accumulated experience over the past ten years a guiding strategy to aid an interdisciplinary team in the conduct of a technology assessment. An array of operations, techniques, and procedures were assembled from theory and practice as candidates for the conduct of each of the fourteen identified tasks. Following the presentation of the basic strategy, four ways of categorizing technology assessments were identified and their effect on emphasis within the basic strategy was noted. GRA

N78-30009# Transportation Research Board, Washington, D. C.
URBAN TRANSPORTATION ECONOMICS: PROCEEDINGS OF FIVE WORKSHOPS ON PRICING ALTERNATIVES, ECONOMIC REGULATIONS, LABOR ISSUES, MARKETING, AND GOVERNMENT FINANCING RESPONSIBILITIES
Irvin P. Halpern et al 1978 267 p refs Sponsored in part by EPA, FEA and DOT
(PB-279689/4; TRB/SR-181; ISBN-0-309-02663-6) Avail: NTIS HC A12/MF A01 CSCL 05A

The long-term forces in the urban transportation market that generate chronic transit deficits were examined along with alternative courses of action to improve economic efficiency and financial viability at the local level. A practical working program for both those who plan and implement policy at the local level and those who develop and administer financial programs at the state and federal levels is given. The financial difficulties that contribute to the deterioration of service for users of both public and private transportation in cities and public transportation deficits are among the topics covered. GRA

N78-30011# Weston Environmental Consultants-Designers, West Chester, Pa.
MULTIPLE WATER SUPPLY APPROACH FOR URBAN WATER MANAGEMENT Annual Report
Arun K. Deb 20 Mar. 1978 132 p refs
(Grant NSF ENV-76-18499)
(PB-279768/6; NSF/RA-780030) Avail: NTIS HC A07/MF A01 CSCL 13B

A systems model was developed to help cities, planners and engineers to decide whether the multiple supply approach to urban water management is beneficial in long-term planning of water resources. Three grades of water were considered in developing the model: potable, subpotable, and nonpotable. Basic water supply data were generated by conducting surveys of water supply systems serving populations around 20,000, 100,000 and 500,000 people all over the country. Cost functions of 36 unit processes were developed and incorporated in the model. The model is very flexible and can handle a conventional system, a dual or multiple system including reuse, or a regional system with up to 10 cities. GRA

N78-30119# Institute for Defense Analyses, Arlington, Va. Cost Analysis Group.
THE FEASIBILITY OF ESTIMATING AVIONICS SUPPORT COSTS EARLY IN THE ACQUISITION CYCLE. VOLUME 1: THE BASIC REPORT Final Report, 17 Jan. - Sep. 1977
John D. Morgan and Aaron B. Fuller Sep. 1977 248 p
(Contract DAHC15-73-C-0200)
(AD-A054016; AD-E500025; P-1292-Vol-1) Avail: NTIS HC A11/MF A01 CSCL 15/5

This paper reports on research to determine the feasibility of developing methods to estimate, early in the system acquisition cycle, the potential support cost inputs of alternative avionics components envisioned for Air Force and Navy fighter aircraft. Support costs are defined as those costs incurred at the organizational, intermediate and depot levels to maintain avionics equipment and the costs of avionics spares and repair parts support. The results of the study are presented in two volumes. Volume I reviews and evaluates current methods used in industry and in the Air Force and Navy to estimate these avionics support costs. Finally, the paper concludes that it is feasible and desirable to prepare these estimates for avionics support costs. The specific method to be adopted depends on the amount of resources OSD wishes to devote to this effort. Volume II is a compilation of appendixes containing additional material to support the basic report, including summary evaluations of forty-eight key documents encountered in the literature search. GRA

N78-30597# Arinc Research Corp., Annapolis, Md.
ONE-YEAR PROGRAM PLAN FOR TEST PROGRAM SET QUALITY ASSURANCE
R. Kole and R. Tanke 1978 30 p
(Contract DAEA18-72-A-0005)
(AD-A054446; Rept-1078-01-2-1746) Avail: NTIS HC A03/MF A01 CSCL 14/2

The Automatic Test Equipment (ATE) is a major item considered during Integrated Logistic Support Planning (AR-700-127) which is required for all weapon systems. Critical elements of automatic test support are the applications software programs written to test the individual parts or subsystems of the system. These software programs are called Test Program Sets (TPSS), and the subsystems they test are called the Units Under Test (UUTs). The TPS consists of a hardware Interface Device that physically connects the UUT to the ATE, and a computer program that controls the ATE functions by automatically selecting and

routing stimuli to the UUT and automatically measuring UUT response. TPS constitute more than 70% of ATE expenditures in the Army today. This report addresses the Government Product Assurance Directorate activities to initiate the establishment of effective policies and procedures for TPS quality assurance. GRA

N78-30986# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
MANUAL OF EDUCATIONAL RESEARCH: PROCEDURES FOR THE DESIGN, CONDUCT AND REPORTING OF RESEARCH IN EDUCATION M.S. Thesis
Maria DoCarmo Salomao Salutti Feb. 1978 144 p refs In PORTUGUESE; ENGLISH summary
(INPE-1195-TPT/081) Avail: NTIS HC A07/MF A01

The manual of educational research was elaborated with the purpose of introducing such procedures in an accessible form and to provide a guide for those interested in carrying out educational research. The preliminary considerations are about the context in which the manual is imbedded, including the role of educational research in the process of educational change and improvement, the importance given to it by the Brasilian Government and, finally, a description of the Brasilian educational research at present. The above is followed by a review on research procedures. A model of procedures for the design, conduct, and reporting of educational research is then introduced and discussed. The components of the model, the procedures represented by it, are then individually described, including their operationalization, exemplification, justification for their inclusion in the model and suggestions about their implementation. B.B.

N78-30987# School of Aerospace Medicine, Brooks AFB, Tex.
COMPUTER SIMULATION OF AIRCREW MANAGEMENT POLICIES Final Report, 1 Jan. 1976 - 1 Nov. 1977
Paul Garcia, Paul A. Lozano, Harry M. Hughes, and Bryce O. Hartman Apr. 1978 13 p
(AD-A054948; SAM-TR-78-15) Avail: NTIS HC A02/MF A01 CSCL 05/9

This report describes a computer program which enables studies on aircrew management policies to be performed. It describes the various inputs, the run time procedures, and the various outputs that were employed in a transport air lift study utilizing the program. The comprehensive but flexible complex of subroutines is easily adapted to inventive, even novel, employment of aircrews. The outputs can then be analyzed for the performance measures of the system. Author (GRA)

N78-31524# Massachusetts Univ., Amherst. Water Resources Research Center.
PUBLIC PARTICIPATION IN WATER RESOURCES PLANNING: A CASE STUDY AND LITERATURE REVIEW Final Report
Madge Ertel and Stuart G. Koch Jul. 1977 62 p refs
(Contract DI-14-34-0001-6086)
(PB-280968/9; Publ-89; Completion-FY-77-10; W78-06809) Avail: NTIS HC A04/MF A01 CSCL 13B

The findings of a survey to determine what modifications in attitudes toward the advisory process and the planning objectives of the Connecticut River Basin Program had occurred since a similar survey was conducted are presented. A review and assessment of significant literature on the theory and practice of public participation in water resources planning is given. GRA

N78-31619# National Technical Information Service, Springfield, Va.
LINEAR PROGRAMMING IN MANAGEMENT. A BIBLIOGRAPHY WITH ABSTRACTS Final Report, 1964 - May 1978
George W. Reimherr Jun. 1978 86 p Supersedes NTIS/PS-77/0541, NTIS/PS-76/0488, NTIS/PS-75/406
(NTIS/PS-78/0604/5; NTIS/PS-77/0541) Avail: NTIS HC $28.00/MF $28.00 CSCL 04A

Government-sponsored research reports concerning linear programming as an aid to the management decision making process are cited. Models are included in the bibliography for various management situations in different industries. GRA

N78-31809# System Development Corp., Santa Monica, Calif.
SOFTWARE ACQUISITION MANAGEMENT GUIDEBOOK: COST ESTIMATION AND MEASUREMENT
Marsha Finfer and Russell Mish Mar. 1978 112 p refs
(Contract F19628-76-C-0236)
(AD-A055574; SDC-TM-5772/007/02; ESD-TR-78-140) Avail: NTIS HC A06/MF A01 CSCL 17/2

The Software Cost Estimation and Measurement guidebook is designed to assist Air Force personnel who are responsible for estimating and controlling the costs of embedded software within command, control, and communications systems. It provides a basic understanding of the current methodologies used in the formation of Air Force and contractor software cost estimates. Insight is provided into some of the problems (and reasons for the problems) associated with software cost estimates made by both Government and industry. The guidebook discusses the role of parametric models used in cost estimation and reviews three experimental predictive models. It also discusses the process of monitoring software costs and schedules while providing guidance to relevant military regulations, specifications, standards, and supporting literature. Much of the information and guidance provided is applicable to smaller less complex systems, but in all cases, it should be tailored to the needs of individual projects. Author (GRA)

N78-31947# National Technical Information Service, Springfield, Va.
DECISION MAKING IN MANAGEMENT. A BIBLIOGRAPHY WITH ABSTRACTS Final Report, 1970 - May 1978
George W. Reimherr Jun. 1978 291 p Supersedes NTIS/PS-77/0580; NTIS/PS-76/0540; NTIS/PS-75/500
(NTIS/PS-78/0605/2; NTIS/PS-77/0580; NTIS/PS-76/0540; NTIS/PS-75/500) Avail: NTIS HC $28.00/MF $28.00 CSCL 05A

Research on decision making is cited. Decision making aids and evaluations of criteria used in decision making are included, as are aids to decision making in various industries research and development, and the military. Decision theoretic models are also covered. GRA

N78-31954*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
OUTLINE OF COST-BENEFIT ANALYSIS AND A CASE STUDY
Abe Kellizy Sep. 1978 28 p refs
(NASA-TM-78984; E-9761) Avail: NTIS HC A03/MF A01 CSCL 05C

The methodology of cost-benefit analysis is reviewed and a case study involving solar cell technology is presented. Emphasis is placed on simplifying the technique in order to permit a technical person not trained in economics to undertake a cost-benefit study comparing alternative approaches to a given problem. The role of economic analysis in management decision making is discussed. In simplifying the methodology it was necessary to restrict the scope and applicability of this report. Additional considerations and constraints are outlined. Examples are worked out to demonstrate the principles. A computer program which performs the computational aspects appears in the appendix. L.S.

N78-31962# Hittman Associates, Inc., Columbia, Md.
OPERATION BREAKTHROUGH SITE MANAGEMENT SYSTEMS AND PNEUMATIC TRASH COLLECTION, EXECUTIVE SUMMARY Final Report
Jack Preston Overman, Terry G. Statt, and David A. Kolman Feb. 1978 40 p
(Contract EPA-68-03-0094)
(PB-280143/9; EPA-600/8-78-001) Avail: NTIS HC A03/MF A01 CSCL 13B

Waste collection systems within buildings, complexes, and municipalities were analyzed and compared as to economics, effectiveness, environmental factors, efficiency of operation, and acceptance by residents. Eight of the sites used various trash collection methods ranging from conventional curbside pickup to centralized compaction and pickup. The ninth site used a pneumatic trash collection (PTC) system. Evaluation of the refuse

management system at the site is summarized particularly the PTC system and the refuse system user acceptance surveys at eight of the nine sites. GRA

N78-31963# Maryland Univ., College Park. Fire Protection Curriculum.
A STATISTICAL SAMPLING OF CITIES: CURRENT AND PROJECTED INVOLVEMENT IN FIRE PREVENTION AND CONTROL MASTER PLANNING Final Report
John C. Fannin, III 8 Dec. 1977 100 p refs
(Contract NFPCA-7-35563)
(PB-279922/9) Avail: NTIS HC A05/MF A01 CSCL 13B

Of the one hundred thirty-seven cities and communities identified as recipients of the National Fire Prevention and Control Administration's urban guide for fire prevention, control and management planning, seventy-three responded to a survey conducted to ascertain current and future involvement in fire master planning. Based on utilization of the urban guide a comparative analysis of population, incorporation, form of government, and type of fire department, by those cities and communities reporting current involvement in a master planning program is included. The relationships, if any between these characteristics and master planning involvement are discussed. GRA

N78-31965# Hittman Associates, Inc., Columbia, Md.
EVALUATION OF THE REFUSE MANAGEMENT SYSTEM AT THE JERSEY CITY OPERATION BREAKTHROUGH SITE Final Report
Jack Preston Overman and Terry G. Statt Feb. 1978 240 p
(Contract EPA-68-03-0094)
(PB-280551/3; EPA-600/2-78-017) Avail: NTIS HC A11/MF A01 CSCL 13B

The solid waste management system at the Jersey City Operation Breakthrough site was evaluated. The economic and technical practicality fo the system application for future residential complexes was assessed. The installation was the first pneumatic trash collection system (PTC) used to collect residential refuse in the U.S. Labor costs, rodents and vermin, odor, litter, and collection noise are described. The cost and operation are also coupled of the PTC system with those aspects of conventional collection systems. GRA

N78-32578# Argonne National Lab., Ill.
COMMUNITY SYSTEMS PROGRAM: ITS GOALS AND ACCOMPLISHMENTS, 1978
Apr. 1978 33 p
(Contract W-31-109-eng-38)
(ANL-78-XX-92) Avail: NTIS HC A03/MF A01

The Community Systems Program is concerned with conserving energy and scarce fuels through new methods of satisfying the energy needs of American communities. These programs are designed to develop innovative ways of combining current, emerging, and advanced technologies into Integrated Community Energy Systems (ICES) that could furnish any, or all, of the energy-using services of a community. The key goals of the Community System Program then, are to identify, evaluate, develop, demonstrate, and deploy energy systems and community designs that will optimally meet the needs of various communities. During 1977, contracts for the following Grid-Connected ICES (G-C ICES) demonstration teams were negotiated: City of Independence, Missouri; Clark University; City of Trenton, New Jersey; Health Education Authority of Louisiana (HEAL); and University of Minnesota. A coal-using ICES, proposed for Georgetown University, also has made noticeable strides toward demonstration of the concept. ERA

N78-32614# Tracor Jitco, Inc., Rockville, Md.
PROCEDURE FOR THE EVALUATION OF ENVIRONMENTAL MONITORING LABORATORIES Technical Report, 10 Jan. 1975 - 10 Jan. 1976
Charles A. Bicking Mar. 1978 227 p refs
(Contract EPA-68-03-2171)
(PB-280718/8; EPA-600/4-78-017) Avail: NTIS HC A11/MF A01 CSCL 13B

A procedure was developed for the on-site evaluation of environmental laboratories in such media as air, water, radiation and pesticides. The procedure includes registration and preliminary questionnaire forms, on-site visits checklist, evaluator's guide and a scoring system for assessment of the laboratory's management, personnel, facilities, analytical methodology and instruments and it quality control procedures. GRA

N78-32806# Naval Postgraduate School, Monterey, Calif.
THE DYNAMIC PROGRAMMING APPROACH TO THE MULTICRITERION OPTIMIZATION PROBLEM M.S. Thesis
Kim Kwang Bog Mar. 1978 64 p refs
(AD-A055697) Avail: NTIS HC A04/MF A01 CSCL 12/2

Decision makers are often confronted with problems for which there exist several distinct measures of success. Such problems can often be expressed in terms of linear or nonlinear programming models with several 'criterion' functions instead of single objective functions. A variety of techniques have been applied to multicriterion problems, but the approach used here, 'The Dynamic Programming Approach to Multicriterion Optimization Problem,' is based on the concept that the ideal solution to a multiobjective problem must be a pareto optimal solution. In many cases simply narrowing the set of candidate solutions to the set of all pareto optimal solutions may enable the decision maker to find the compromise being sought. The determination of nondominated points and corresponding nondominated values (pareto optimal solution) related to the multicriterion optimization problem is approached through the use of dynamic programming. The dynamic programming approach has an attractive property which provides the basis for generation of nondominated solutions at each stage by the decomposition method. By using recursive equations we can find out the nondominated points and corresponding nondominated solutions of multiaggregate return function. Author (GRA)

N78-32909 Texas Univ. at Dallas.
MATERIAL REQUIREMENTS PLANNING, SCHEDULING AND INVENTORY CONTROL Ph.D. Thesis
Howard Bennett Hamilton, Jr. 1978 106 p
Avail: Univ. Microfilms Order No. 7815786

A general mathematical model of the material requirements planning problem in the manufacturing industry is formulated. An efficient system is proposed that computes near-optimal solutions of the model. The system consists of a capacity planning algorithm and a scheduling algorithm. The capacity planning algorithm aggregates the resource requirements of the independent demand items (end products and repair parts) and computes a smoothed capacity plan to meet a proposed master schedule over the planning horizon. Using several heuristic rules, the scheduling algorithm determines due dates for all components, including purchased parts and raw materials, and constructs a feasible production schedule for all products and components at low total cost. Dissert. Abstr.

N78-32910# United Technologies Research Center, East Hartford, Conn.
COMPUTERIZED PRODUCTION PROCESS PLANNING Final Technical Report, 30 Jun. 1976 - 31 Aug. 1977
Wilbur S. Mann, Mark S. Dunn, Jr., and Steven J. Pflederer Nov. 1977 191 p refs
(Contract DAAK40-76-C-1104)
(AD-A055893; UTRC/R77-942625-14) HC A09/MF A01 CSCL 05/3

A computerized production process planning system was demonstrated. The system performs generative process planning for machined cylindrical parts. Manufacturer-independence is achieved by using process decision models that express local manufacturing practice. A man-machine communications interface permits human oversight/modification of process plan development. Industry surveys were conducted to collect data relevant to the benefits of computerized process planning. Results of the surveys are summarized. Cash flow analyses estimating cost savings to industry are presented. Benefits of the demonstration system in defense procurement are projected. Author (GRA)

N78-32911# Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio.
AIR FORCE FLIGHT DYNAMICS LABORATORY FISCAL YEAR 1979. TECHNICAL OBJECTIVE DOCUMENT
Jan. 1978 57 p Supersedes AFFDL-TR-77-33
(AD-A055711; AFFDL-TR-78-6; AFFDL-TR-77-33) Avail: NTIS HC A04/MF A01 CSCL 01/3

The document presents an overview of the Technical Planning Objectives and supporting data for each. These are extracted from the technical plan of the Air Force Flight Dynamics Laboratory (AFFDL). Information is largely based on AFFDL fiscal 1979 technology plan omitting specific funding and timing information of an 'Official Use Only' nature. Technical objectives are described for the four technical areas of: Structural Mechanics, Vehicle Equipment/Subsystems, and Flight Control and Aeromechanics. Points of contact for more information in each of the areas are identified. GRA

N78-32912# CACI, Inc. - Federal, Arlington, Va. Policy Sciences Div.
EXECUTIVE AID FOR CRISIS MANAGEMENT Final Technical Report, 1 Dec. 1976 - 30 Sep. 1977
Leo Hazelwood, Robert Mahoney, Farid Abolfaith, Janice Fain, and John Hayes 15 May 1978 68 p refs
(Contract N00014-77-C-0135; ARPA Order 2928)
(AD-A055677, CACI-008) Avail: NTIS HC A04/MF A01 CSCL 05/1

This report describes the development and structure of CACI's crisis management executive aid developed for the Cybernetics Technology Office of the Defense Advanced Research Projects Agency; presents the structure of the executive aid and reviews the characteristics and uses the three data files that are available for analysis, which deal with crisis characteristics, actions and objectives, and crisis management problems; describes the data used in the aid; reviews the findings and analyses that have been performed to date on the data file; and describes procedures used to evaluate the executive aid and to transfer it to locations accessible to the U.S. Government and other users. The operation of the executive aid itself is described in detail in several separate volumes, a User's Guide, a Program Documentation Manual, a Sample Output, and a Codebook. GRA

N78-32913# National Technical Information Service, Springfield, Va.
PERT. A BIBLIOGRAPHY WITH ABSTRACTS Final Report, 1964 - May 1978
George W. Reimherr Jun. 1978 219 p Supersedes NTIS/PS-77/0519; NTIS/PS-76/0484; NTIS/PS-75/439; COM-74-10918
(NTIS/PS-78/0549/2; NTIS/PS-77/0519; NTIS/PS-76/0484; NTIS/PS-75/439; COM-74-10918) Avail: NTIS HC $28.00/MF $28.00 CSCL 05A

The use of PERT in various management areas, including military management, construction management, financial management, and many other areas are presented. Other management techniques, such as the critical path method, are included in conjunction with PERT. (This updated bibliography contains 211 abstracts, 18 of which are new entries to the previous edition.) GRA

N78-32914# National Technical Information Service, Springfield, Va.
PERSONNEL MANAGEMENT IN REMOTE, ISOLATED, AND CONFINED AREAS. A BIBLIOGRAPHY WITH ABSTRACTS Final Report, 1964 - Jun. 1978
Carolyn Shonyo Jun. 1978 45 p Supersedes NTIS/PS-77/0553; NTIS/PS-76/0449
(NTIS/PS-78/0595/5; NTIS/PS-77/0553; NTIS/PS-76/0449) Avail: NTIS HC $28.00/MF $28.00 CSCL 05I

Annotated references are cited concerning behavior in remote, isolated, and confined environments, with specific application to personnel management in these areas. Antarctic work areas and submarine environments are included. The topics covered include personnel selection, performance evaluation, group dynamics, social communication, social isolation, psychological aspects, and personality factors. (This updated bibliography contains 40 abstracts, none of which are new entries to the previous edition.) GRA

N78-32930# Public Technology, Inc., Washington, D. C.
LAND MANAGEMENT. A MANAGEMENT REPORT FOR STATE AND LOCAL GOVERNMENTS
1977 31 p 4 Vol.
(Grant NSF ISP-76-84564)
(PB-281313/7; NSF/RA-770450) Avail: NTIS HC A03/MF A01; also available in set of 4 reports HC E09, PB-281312-SET CSCL 13B

Three sequential functions in the land management process are planning, implementing and monitoring. The planning function includes defining critical land management issues; formulating goals and objectives; developing plans and programs to meet these objectives; and adopting budgets, policies, standards, regulations, and procedures. The implementing function includes determining the appropriate level of review for land use or development proposal assessing their consequences, and approving or rejecting the proposals. The monitoring function includes inspecting projects; correcting deviations from land management codes, standards, regulations, and agreement; and evaluating the effectiveness of land management objectives, plans, programs, policies, and procedures. GRA

N78-32931# Public Technology, Inc., Washington, D. C.
LAND MANAGEMENT. SELECTED PARTICIPATORY TECHNIQUES FOR STATE AND LOCAL GOVERNMENTS
1977 64 p refs 4 Vol.
(Grant NSF ISP-76-84564)
(PB-281314/5; NSF/RA-770451) Avail: NTIS HC A04/MF A01 CSCL 13B

Techniques augment existing opportunities that the community, elected officials, and government staff can use in the land management process including: (1) public involvement programs that establish a framework for managing community participation as a process; (2) mass media to prepare the public for active participation through education, information dissemination, and notification of participatory activities; (3) games to broaden the perspectives of game players; (4) community workshops to enable the community and elected officials to more actively participate in land management planning; (5) nominal group and Delphi processes structure group interactions, and (6) surveys to provide more accurate feedback on public perceptions, desires, needs, preferences, priorities, opinions, and experiences. GRA

N78-32932# Public Technology, Inc., Washington, D. C.
LAND MANAGEMENT. SELECTED ANALYTICAL TECHNIQUES FOR STATE AND LOCAL GOVERNMENTS
1977 100 p refs 4 Vol.
(Grant NSF ISP-76-84564)
(PB-281315/2; NSF/RA-770452) Avail: NTIS HC A05/MF A01; also available in set of 4 reports HC E09, PB-281312-SET CSCL 13B

Potential impacts of land use or development decisions on communities and their environments may be determined from impact measures; assessment matrices; cause-condition-effect network; data collection, analysis and evaluations; cost-revenue analysis; program evaluation and analysis; and standards to be used as benchmarks against which to make comparisons. GRA

N78-32933# Public Technology, Inc., Washington, D. C.
LAND MANAGEMENT. CONTROLS AND INCENTIVES FOR USE BY STATE AND LOCAL GOVERNMENTS
1977 158 p refs 4 Vol.
(Grant NSF ISP-76-84564)
(PB-281316/0; NSF/RA-770453) Avail: NTIS HC A08/MF A01; also available in set of 4 reports HC E09, PB-281312-SET CSCL 13B

Sixty-eight implementation techniques written for land management programs are evaluated. The controls and incentives included are: (1) policy and assessment tools to provide government with a framework for evaluating land use and development proposals against established standards; (2) regulatory mechanisms to provide direct control over land

use and development; (3) capital expenditures for stimulating private development and controlling land use patterns; and (4) revenue mechanisms which indirectly influence land use and development in the form of property taxes, special taxes and fees, and exactions. GRA

N78-33097# Battelle Columbus Labs., Ohio.
SYSTEM AVIONICS VALUE ESTIMATION (SAVE): AN AID FOR AVIONICS LOGISTICS-AND-SUPPORT-COST ANALYSES Final Report, 15 Jul. 1976 - 30 Jun. 1977
Thomas R. Cork and Joan F. Mulcahy Sep. 1977 284 p refs
(Contract F33615-76-C-1299)
(AD-A056348; AFAL-TR-77-179) Avail: NTIS HC A13/MF A01 CSCL 01/3

This report documents a research effort to develop an interactive graphics computer system which will allow government cost analysts to exercise five existing logistics and support cost models in an integrated, consistent, and efficient manner. GRA

N78-33467# Pennsylvania State Univ., University Park. Dept. of Architectural Engineering.
CONSTRUCTION QUALITY CONTROL SYSTEMS: A COMPARATIVE ANALYSIS M.S. Thesis
Scot H. Shepard Nov. 1977 138 p refs
(AD-A056334) Avail: NTIS HC A07/MF A01 CSCL 13/3

Traditionally, construction quality control has been characterized by lack of planning, little management support, and an emphasis on inspection to detect construction errors. In the early 1970's, three quality control systems were developed which consider quality control during all phases of a construction project, and which emphasize the prevention of construction errors. The three systems are highway construction statistical quality control, nuclear power plant construction quality assurance, and U.S. Navy contractor quality control. A comparative analysis of these systems and building construction quality control, which represents the traditional approach, is provided. Each approach to quality control is analyzed according to its planning, procedures, and organization and management aspects. The comparative analysis provides an overview of construction quality control, and a set of management tools available to any owner contemplating a construction project. Author (GRA)

N78-33563# Department of Energy, Washington, D. C.
DEMONSTRATION PROJECT AS A PROCEDURE FOR ACCELERATING THE APPLICATION OF NEW TECHNOLOGY. CHARPIE TASK FORCE REPORT, VOLUME 1
Feb. 1978 48 p 2 Vol.
(Contract EX-76-C-01-2295-006)
(DOE/RA-0003/1-Vol-1) Avail: NTIS HC A03/MF A01

Following the establishment on January 19, 1975, of the Energy Research and Development Administration, the Task Force on Demonstration Projects was organized to assist the new agency in evaluating its planning and management of its projects. The agency was to support research and development in energy-related areas, to be applied to the civil sector. The agency was also authorized to support the commercialization of new energy technology. The Task Force concluded it could not adequately provide guidance or demonstrations without examining ERDA's general commercialization role as defined in the statute. The Task Force decided to concentrate on these general aspects of the subject. The Task Force's general conclusions and recommendations on ERDA's overall commercialization role are given along with its specific consideration of the demonstration project and the demonstration project guidelines. ERA

N78-33564# Department of Energy, Washington, D. C.
DEMONSTRATION PROJECT AS A PROCEDURE FOR ACCELERATING THE APPLICATION OF NEW TECHNOLOGY. CHARPIE TASK FORCE REPORT, VOLUME 2
Feb. 1978 461 p 2 Vol.
(Contract EX-76-C-01-2295-006)
(DOE/RA-0003/2-Vol-2) Avail: NTIS HC A20/MF A01

The issues associated with government programs proposed for the commercialization of new energy technologies are examined. These include: (1) the role of research and development within the structure of the national energy goals and policies; (2) the process of technological change as it occurs with respect to energy technologies in terms of sources of misalignment of social and private incentives; (3) correction of the sources of misalignment as the goal of commercial demonstration programs; and (4) circumstances under which government supported commercialization is likely to affect the success of subsequent stages of technological change. Methods for evaluation and planning of commercial demonstration programs are analyzed.

N78-33565# Battelle Pacific Northwest Labs., Richland, Wash.
ANALYSIS OF FEDERAL INCENTIVES USED TO STIMULATE ENERGY PRODUCTION: AN EXECUTIVE SUMMARY
B. W. Cone, D. L. Brenchley, V. L. Brix, M. L. Brown, K. E. Cochran, R. J. Cole, M. G. Curry, R. Davidson, J. Easterling, and A. G. Fassbender Mar. 1978 15 p
(Contract EY-76-C-06-1830)
(PNL-2410) Avail: NTIS HC A02/MF A01

An analysis was made of past and present Federal incentives to production of various energy sources and therby assist the Division of Solar Energy, Energy Research and Development Administration, in the study and recommendation of Federal incentives for the development of solar energy. The research was divided into five parts: a survey of current thought about incentives for solar energy production; the theoretical approach to analyzing and characterizing incentives; a generic view of the energy incentive-creating landscape for 1976; analysis of the major energy sources along their trajectories from exploration to waste management, including their costs in 1976 dollars; and insights into potential incentives for solar policy. Economic, political, organizational, and legal viewpoints were considered in formulating the typology of incentives. ERA

N78-33607# General Accounting Office, Washington, D. C. Energy and Minerals Div.
THE MULTIPROGRAM LABORATORIES: A NATIONAL RESOURCE FOR NONNUCLEAR ENERGY RESEARCH, DEVELOPMENT, AND DEMONSTRATION Report to the Congress
22 May 1978 101 p refs
(PB-281265/9; EMD-78-62) Avail: NTIS HC A06/MF A01 CSCL 10A

The multiprogram laboratories and their enormous scientific and technical potential for the development of nonnuclear energy technologies are examined. The eight laboratories represent a cumulative capital investment of over $3 billion. They have a diversity of scientific and technical resources, manpower, and plant facilities for developing new energy technologies. Suggestions for using these laboratories in nonnuclear energy in a manner which would improve their working relationships with other research entities are presented. GRA

N78-33787*# Naval Ship Research and Development Center, Annapolis, Md.
ENGINEERING DATA MANAGEMENT: EXPERIENCE AND PROJECTIONS
David K. Jefferson and Bernard Thomson *In* NASA. Langley Res. Center Eng. and Sci. Data Management 1978 p 223-242 refs
Avail: NTIS HC A12/MF A01 CSCL 09B

Experiences in developing a large engineering data management system are described. Problems which were encountered are presented and projected to future systems. Business applications involving similar types of data bases are described. A data base management system architecture proposed by the business community is described and its applicability to engineering data management is discussed. It is concluded that the most difficult problems faced in engineering and business data management can best be solved by cooperative efforts. G.G.

N78-33797# Perceptronics, Inc., Woodland Hills, Calif.
APPLICATION OF ADAPTIVE DECISION AIDING SYSTEMS TO COMPUTER ASSISTED INSTRUCTION: ADAPTIVE COMPUTERIZED TRAINING SYSTEM (ACTS) Technical Report, 1 Jan. - 30 Nov. 1976
William H. Crooks, Michael A. Kuppin, and Amos Freedy Jun. 1978 51 p refs

(Contract DAHC19-76-C-0019)
(AD-A056900; ARI-TR-78-A6) Avail: NTIS HC A04/MF A01 CSCL 05/9

This report describes the Adaptive Computerized Training System (ACTS) which combines the techniques of circuit simulation, artificial intelligence, decision modeling, and adaptive computer-assisted instruction to provide training in decision making. The ACTS incorporates an adaptive computer program which learns a student's value structure and uses this structure to train the student in practical decision making. This report describes the development and operation of the ACTS as it is applied to training electronics troubleshooting. Experimental evaluations have demonstrated that the adaptive decision model accurately models a student's performance, and that adaptively-selected instructions and decision feedback can improve trouble-shooting performance. Author (GRA)

N78-33864 Rochester Univ., N. Y.
THE MULTI-PRODUCT PRODUCTION CYCLING PROBLEM Ph.D. Thesis
Stephen Clyde Graves 1978 163 p
Avail: Univ. Microfilms Order No. 78-15277

The one-product problem is formulated and solved as a Markov decision problem. A conjecture is given that the optimal policy is a two-critical-number policy; theoretical and empirical evidence is presented to support this conjecture. An alternative formulation, based on queueing theory concepts, is also given. The multi-product problem may also be formulated as a Markov decision problem, but the formulation is too large to be solvable in practice. Heuristic decision procedures are proposed for various versions of the problem. These heuristics are based on the results of the one-product analysis, and on two key notions: the composite product and the lead-time adjustment. The heuristics are tested by means of simulation, and are shown to be effective relative to alternative heuristics and to cost bounds on the problem. Dissert. Abstr.

N78-33866 Pennsylvania Univ., Philadelphia.
PLANNING TELECOMMUNICATIONS SYSTEMS: A NORMATIVE APPROACH Ph.D. Thesis
Joao Lopes De Albuquerque Montenegro 1978 154 p
Avail: Univ. Microfilms Order No. 78-16336

A normative decision making framework is proposed for telecommunications systems planning. First, flexibility is defined as the management and engineering margins implemented in the systems to cope with the uncertainties of the systems requirements. The current decision making procedures are then shown to be contained within the decision making structure of decision analysis, which is enhanced to account for the increasingly important problems of flexibility in today's planning of telecommunications systems. The improvements brought by this structure include: (1) capability to incorporate the uncertainties of the systems requirements into the decision making process; (2) capability to define the systems margins in a consistent manner; (3) capability to account for the flexibility preferences of the decision maker; (4) capability of more meaningful comparisons of candidate alternatives; and (5) capability to define the overall system with the same level flexibility. Dissert. Abstr.

N78-33976 Pennsylvania Univ., Philadelphia.
COOPERATIVE RESEARCH AND DEVELOPMENT AND ASSOCIATED GOVERNMENT POLICY Ph.D. Thesis
Prafulla Nara Yan Joglekar 1978 297 p
Avail: Univ. Microfilms Order No. 7816379

The basic methodology of the research is to model the resource allocation behavior of a group of firms under a variety of government policies. Individual firms are assumed to be rational, self-interested, and risk averse. R&D activities under consideration are characterized by associated risk, and the existence or nonexistence of attributes such as inappropriability, nonrivalness or interdependence. Resource allocation behavior of an industry depneds not only upon the attributes of pertinent R&D activities and member firms but also upon several other system characteristics, including industry structure (i.e., the number and relative sizes of firms involved,), and interfirm cooperation. Specific circumstances are identified under which some of the popularly held views about government intervention are valid and circumstances under which they are not. Several changes in current policies are suggested. Recommendations are provided for immediate as well as long term government action in support of cooperative R&D. Dissert. Abstr.

N78-33977# *Logicon, Inc., Lexington, Mass.*
MANAGEMENT INFORMATION SYSTEM FOR ESD PROGRAM OFFICES Final Report, Jul. - Nov. 1977
F. Coker, L. Johnson, and D. Smith Mar. 1978 173 p
(Contract F19628-77-C-0178)
(AD-A056103; ESD-TR-78-132) Avail: NTIS HC A08/MF A01 CSCL 09/2

This report is the result of an initial study effort to identify the management information needs and to define the requirements for an integrated information system within the AF Electronic Systems Division (ESD) acquisition environment. The Management Information System (MIS) functional requirements for the ESD Program Office are defined in terms of the Computer-Aided Design and Specification Tool. The development of the computer data base and a description of the MIS structure is included in the report. This report addresses management areas such as cost/budgeting, scheduling, tracking capabilities, and ECP control. GRA

N78-33978# *Michigan Univ., Ann Arbor. Inst. for Social Research.*
COMPARATIVE ISSUES AND METHODS IN ORGANIZATIONAL DIAGNOSIS. REPORT 2: THE DECISION TREE APPROACH
Gloria E. Wheeler Aug. 1978 27 p
(Contract N00014-77-C-0096)
(AD-A057160) Avail: NTIS HC A03/MF A01 CSCL 05/1

This report describes the decision-tree approach to organizational diagnosis. The advantages and disadvantages of the decision approach generally, and in this study specifically, are examined. A pre-test, using a civilian sample of 174 work groups with Survey of Organizations data, was conducted to assess various decision-tree classification criteria, in terms of their similarity to the distance function used by Bowers and Hausser (1977). The results suggested the use of a large developmental sample, which should result in more distinctly defined boundary lines between classification profiles. Also, the decision matrix was preferred over the extended decision tree, since the matrix is not path-dependent, and is probably more convenient and easily used by a decision maker. Finally, it is anticipated that the classification criteria (minimum-maximum vs. standard scores) will yield different results, with the standard score approach results perhaps being more similar to those of the distance function. Author (GRA)

N78-33981# SDC/Integrated Services, Inc., Research Triangle Park, N. C.
NATIONAL COMPUTER CENTER PERSONNEL MANAGEMENT INFORMATION SYSTEM DESIGN REQUIREMENTS SPECIFICATION. VOLUME 1: DESIGN REQUIREMENTS AND DATA DICTIONARY
17 Mar. 1978 249 p
(Contract EPA-68-02-2832)
(PB-282589/1) Avail: NTIS HC A11/MF A01; also available in set of 3 reports HC E14, PB-282588-SET CSCL 05I

The design requirements for an EPA personnel management information system are discussed as well as an index system which would be independent of a specific computer configuration and adaptable to a data base management system. Topics cover: (1) processing requirements; (2) an inclusive set of reports to be produced by the system; and (3) definition of all the input data elements needed to produce those reports. GRA

N78-33982# SDC/Integrated Services, Inc., Research Triangle Park, N. C. NCC-Support Branch.
NATIONAL COMPUTER CENTER PERSONNEL MANAGEMENT INFORMATION SYSTEM DESIGN REQUIREMENTS SPECIFICATION. VOLUME 2: REPORT INDEX AND FORMATS

17 Mar. 1978 348 p
(Contract EPA-68-02-2832)
(PB-282590/9) Avail: NTIS HC A15/MF A01; also available in set of 3 reports HC E14, PB-282588-SET CSCL 05I

The personnel management information system appendices are structured to conform to the following basic management areas: awards; data base integrity; equal employment opportunity; employment and special programs; experience and education; executive development; job history; labor relations and grievances; management evaluation; national reports; position management and control; production reports; and training. Each appendix contains proposed report descriptions and formats considered pertinent to a particular management area. In many cases, reports were designed to provide data which is relevant to more than one management area. GRA

N78-34000# National Bureau of Standards, Washington, D. C.
SCIENCE ON ITS WAY TO WORK: ACTIVITIES OF THE NATIONAL BUREAU OF STANDARDS
Michael A. Baum and Sharon A. Washburn Apr. 1978 49 p
Supersedes NBS-SP-467; PB-264814
(PB-282044/7; NBS-SP-498; NBS-SP-467; PB-264814) Avail: NTIS HC A03/MF A01 CSCL 05B

The activities of the National Bureau of Standards during the fiscal year ending September 30, 1977 are described. Particular attention is paid to the impact of these programs on *industry, government, and the international scene, as well as* our everyday lives. Emphasis is also placed on the transfer mechanisms, how technology gets from here to there. The report includes a people section, a list of selected publications, a financial statement, staff statistics, a summary of legislation on which NBS missions are based, and a directory listing the Bureau's major programs and divisions with managers and their phone numbers. GRA

N78-34003 Portland State Univ., Oreg.
THE STATISTICAL MANIPULATION OF DELPHI STATEMENTS Ph.D. Thesis
Bradley William Nelson 1978 247 p
Avail: Univ. Microfilms Order No. 7813886

The Delphi technique is gaining wider and wider acceptance as a tool for forecasting technology; gathering expert opinion from a local to world wide advice community upon which government, industry, and other policy making bodies must so frequently rely; and providing judgmental input for studies (e.g., social sciences) where hard data are unavailable or too difficult to obtain. An increased danger of manipulation of a Delphi to produce the results desired by one certain individual or group of individuals is studied. The results of these studies showed a high degree of success in obtaining a desired value through the use of manipulated statistical feedback. The effects of statistical manipulation on confidence as measured by self-rating was also studied. Suggestions for extending the research in the area of manipulation of Delphi statements plus a taxonomy of the variables that comprise the problem of manipulation are discussed.
Dissert. Abstr.

N78-34005 Polytechnic Inst. of New York.
MULTI-OBJECTIVE ANALYSIS APPLIED TO AREAWIDE WASTEWATER MANAGEMENT Ph.D. Thesis
Kevin John Phillips 1978 182 p
Avail: Univ. Microfilms Order No. 7816638

The study indicated that optimization techniques can be utilized not as the final answer but as an effective screening tool to enable more objectives to be considered in more detail in subsequent analysis. It was also shown that quantitatively integrating citizen preferences (objective weights) into decisions is possible and that it can be accomplished by a relatively simple questionnaire that utilizes both a pairwise comparison of objectives as well as an objective ranking technique. Finally, it was pointed out that because the objectives are all competing relative to each other, the final outcome was not as easy a decision as it might have been had only one objective been considered.
Dissert. Abstr.

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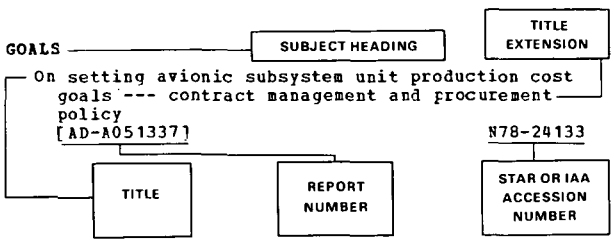

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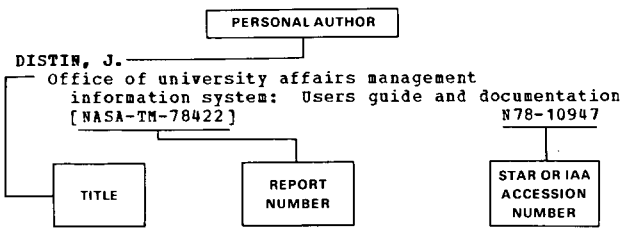

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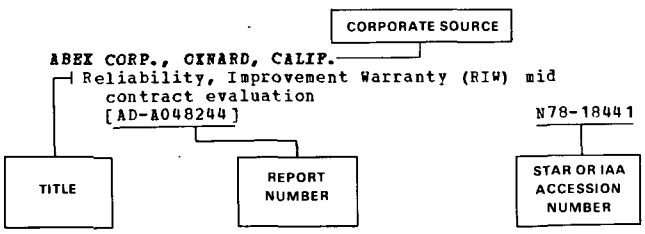

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Air Force Flight Dynamics Laboratory fiscal year 1978 technical objective document
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APPLIED SCIENCE ASSOCIATES, INC., VALENCIA, PA.
TSM guide to training development and acquisition for major systems
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ARGONNE NATIONAL LAB., ILL.
Community systems program: Its goals and accomplishments, 1978
[ANL-78-XX-92] N78-32578

ARINC RESEARCH CORP., ANNAPOLIS, MD.
One-year program plan for test program set quality assurance
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ARINC RESEARCH CORP., SANTA ANA, CALIF.
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ARMY RESEARCH AND TECHNOLOGY LABS., MOFFETT FIELD, CALIF.
Army aviation RDT and E plan, sixth edition
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Army research and technology laboratories, FY 1977
[AD-A049212] N78-20011
Army aviation RDT and E plan. Sixth edition: Executive summary
[AD-A049213] N78-20012

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BARRY (THEODORE) AND ASSOCIATES, LOS ANGELES, CALIF.
SAMICS support study. Volume 1: Cost account catalog
[NASA-CR-157131] N78-24974

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Management of social and economic impacts associated with the construction of large-scale projects: Experiences from the Western coal development communities
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